SUGAR y AZUCAR

OCTOBER 1958

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200 lb. S.P.
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LUNKENHEIMER
QUALITY

LUNKENHEIMER®
THE ONE *Great* NAME IN VALVES

Factory	Country	Diameter
64. Taiwan Sugar Corp.	Formosa	20
65. Taiwan Sugar Corp.	Formosa	22
66. Taiwan Sugar Corp.	Formosa	22
67. Taiwan Sugar Corp.	Formosa	28
68. Cunagua	Cuba	36
69. Jaronu	Cuba	28
70. Cuba	Cuba	24
71. Violeta	Cuba	30
72. Catarey	Dominican Republic	28
73. Romana	Dominican Republic	30
74. Consuelo	Dominican Republic	32
75. Boca Chica	Dominican Republic	20
76. Montelimar	Nicaragua	18
77. Casa Grande	Peru	32
78. Pucala	Peru	22
79. San Jacinto	Peru	20
80. Ormoc	Philippines	19
81. Plata	Puerto Rico	22
82. Breaux Bridge	Louisiana (U.S.A.)	20
83. Kolhapur	India	24
84. Sugauli	India	18
85. Neoli	India	20
86. Godavari	India	22
87. Mysore	India	20
88. Upper Ganges	India	22
89. Belsund	India	20
90. New India	India	22
91. Oudh	India	28
92. Brihan	India	22
93. Maduranthakham	India	18
94. Madras I	India	16
95. Madras II	India	16
96. Zeyawadi	Burma	20
97. Zeyawadi	Burma	20
98. Savanna	Reunion	22
99. Fairymead	Australia	22
100. Rio Grande	Argentina	22
101. Concepcion	Argentina	26
102. Ledesma	Argentina	20
103. Ledesma	Argentina	30
104. Matari	Brazil	14
105. Serro Azul	Brazil	14
106. Sao Martinho	Brazil	30

106 UNITS to date

World-Wide Acceptance* of New RapiDorr Clarifier

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Since its development 5 years ago, 106 RapiDorr Clarifiers — 43 in 1957 — have been ordered by sugar manufacturers in 27 countries throughout the world for both new installations and for conversion of existing stations. For more information on the RapiDorr write for a copy of Bulletin No. 4092, which is also printed in Spanish No. 4092-S.

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SUGAR y AZUCAR

Volume 54, No. 10 October, 1958

CONTENTS

Address of Welcome 35
Presidential Address 36
Highlights of the 32nd Annual Meeting of the A. T. A. C. 37
A. T. A. C. Board of Directors 39
Library of the A. T. A. C. 40
Status of Cane Agriculture in Cuba 41
Mill Control in Cuba 44
Personal Press 47
Costa Rica 48
Human Relations 50
Facts About Sugar 51
Abstracts of the World's Sugar Literature 54

CONTENIDO

63 Mensaje de Bienvenida
64 Discurso del Presidente
65 La 32ª Conferencia Anual de la A. T. A. C.
67 Junta Directiva—Técnicos Azucareros de Cuba
68 Biblioteca de la A. T. A. C.
70 Adelantos en la Agricultura de la Caña en Cuba y en el Control del Borer
94 Concepto Moderno de Regulación de Molienda—Cuba Está Adoptanda el Nuevo Sistema
106 Extractos de Publicaciones Azucareras

COVER *The 32nd Annual Conference of the Asociación de Técnicos de Azucareros de Cuba will center its attention this month, not only on the technology of sugar production, but on many other products as well. This broadened scope of the meeting in Havana is represented on our front cover, where Charles Kroger suggests building material, sucrochemistry, cattle feeding and newsprint as a few of the many products that now engage the attention of sugar technologists.*

CUBIERTA *La 32ª Conferencia Anual de la Asociación de Técnicos Azucareros de Cuba concentrará su atención este mes, no sólo en la tecnología de la producción de azúcar, sino en muchos otros productos. Este más amplio alcance de la reunión en La Habana se ilustra en nuestra cobierta, donde Charles Kroger sugiere material de construcción, la sucroquímica, pienso para ganado y papel de periódico como unos cuantos de los múltiples productos que ahora ocupan la atención de los tecnólogos azucareros.*

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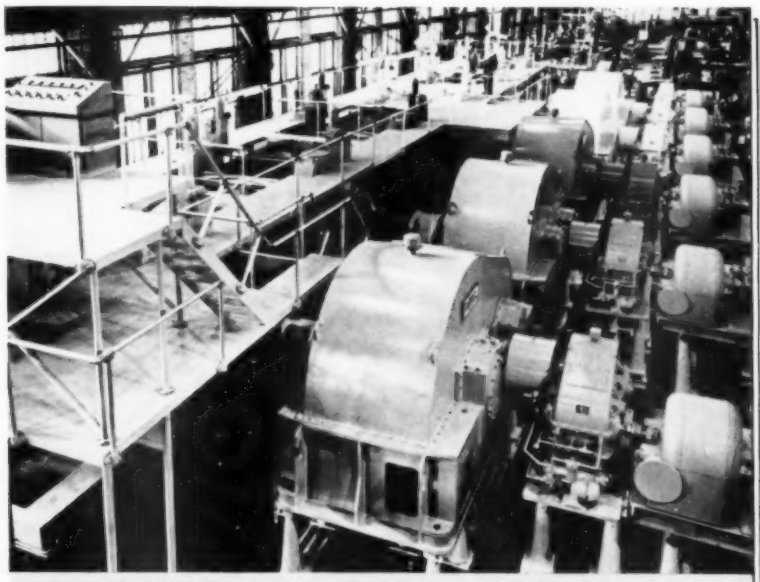

FARREL® SUGAR MILLS

Bulletin 312

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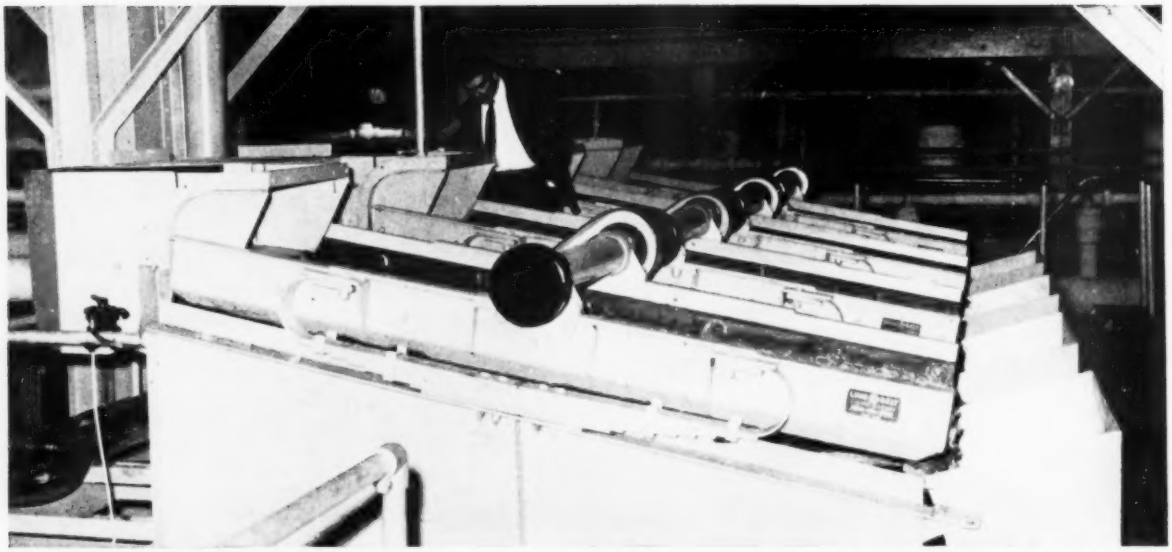

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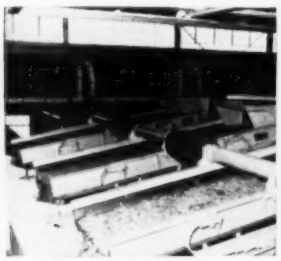
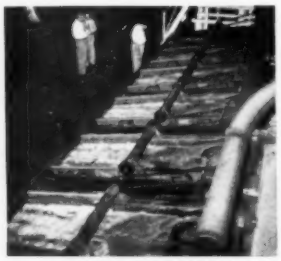
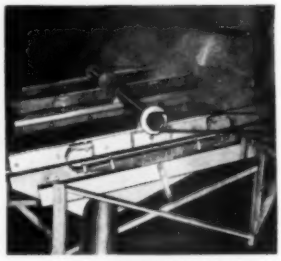


PRIMARY SCREENING of cold juice separates bagasse from liquid. For best results, 10 to 30-mesh cloth is recommended.

SECONDARY SCREENING provides finer separation of solids from cold juice. Recommended screens range from 20 to 40-mesh cloth.



SCREENING HOT JUICE discharged from clarifier requires 40 to 100-mesh cloth to remove impurities solidified in heating process.



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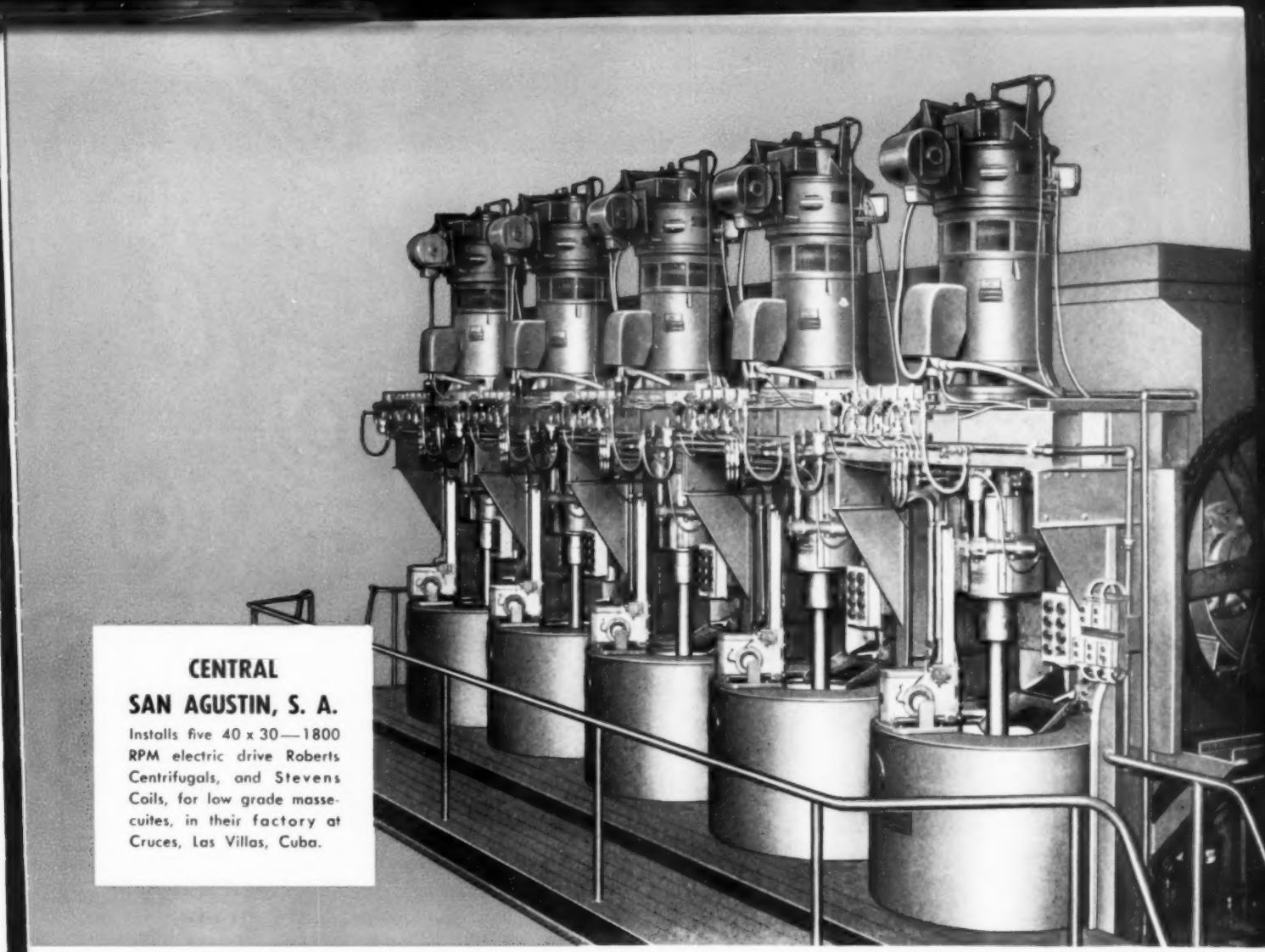

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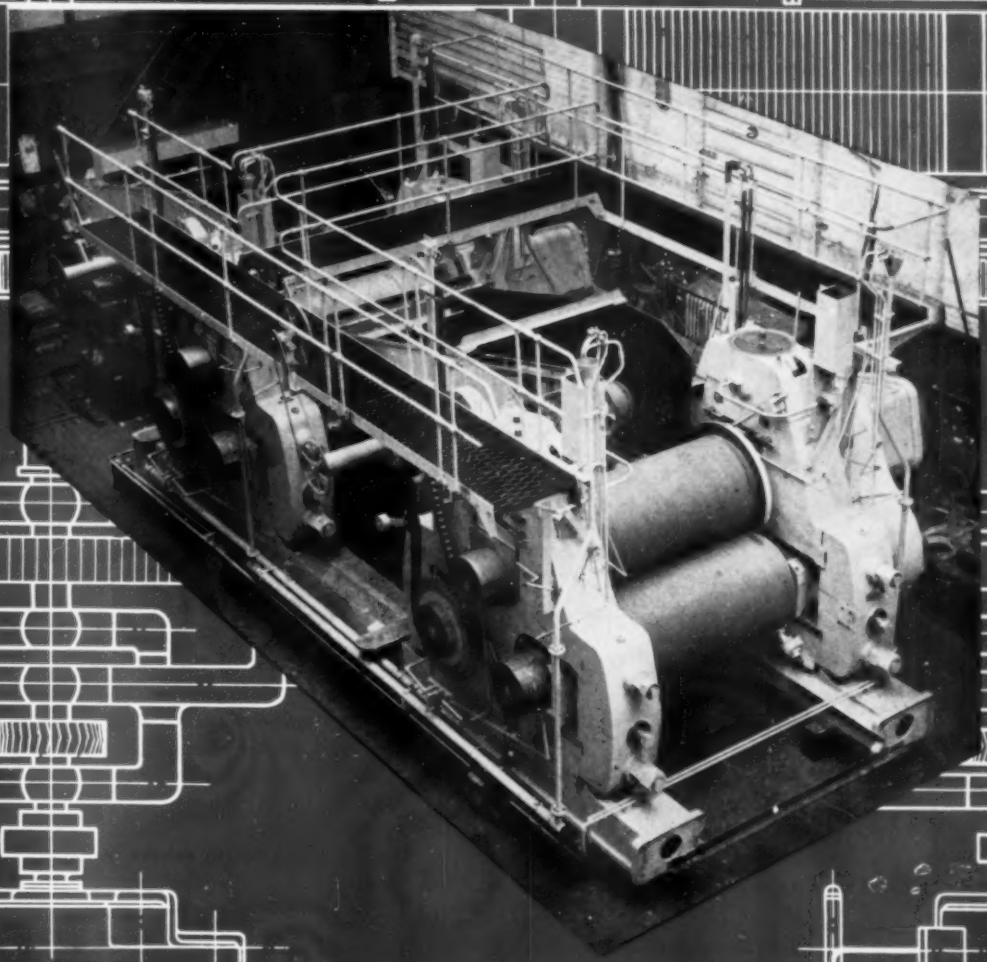

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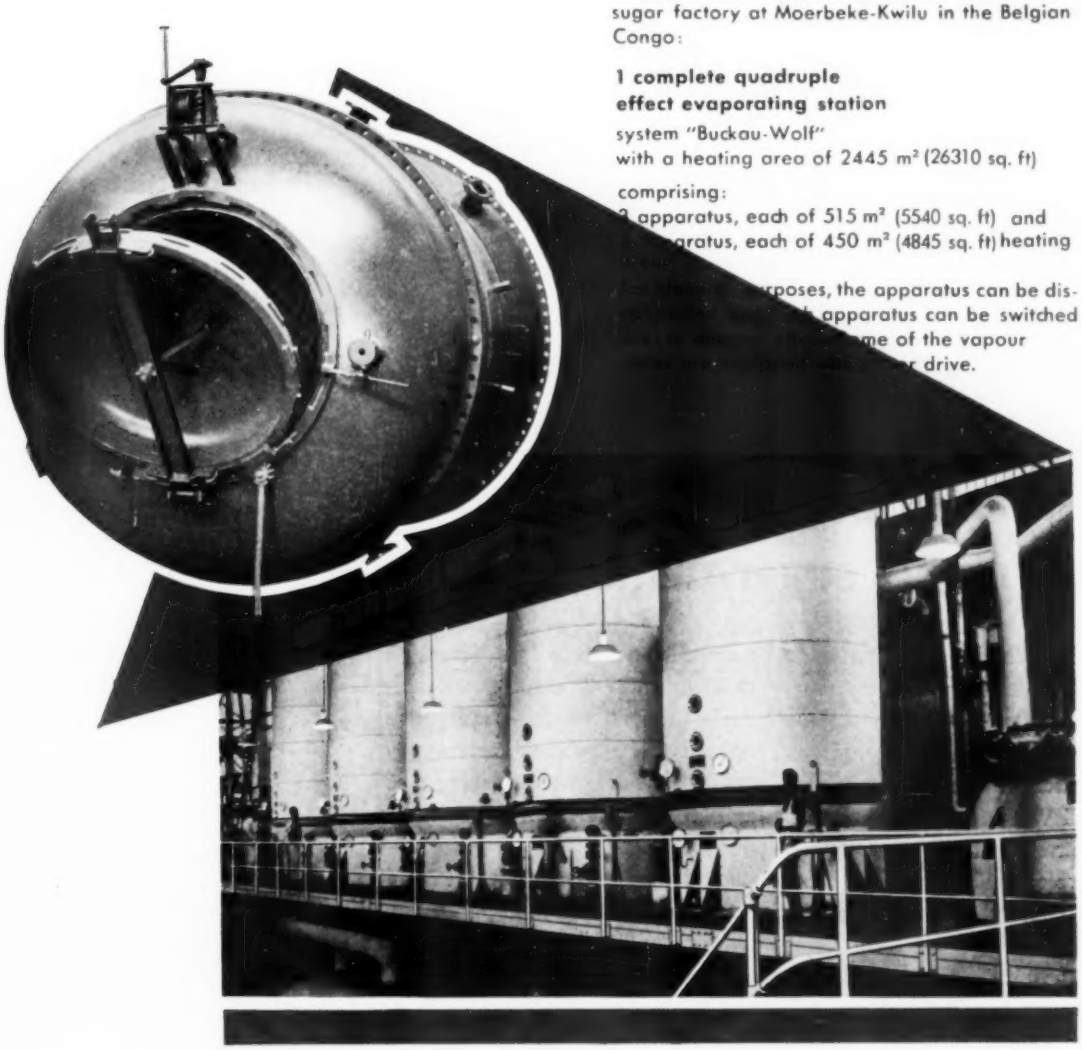
[illegible] apparatus, each of 515 m² (5540 sq. ft) and [illegible]aratus, each of 450 m² (4845 sq. ft) heating

[illegible]rposes, the apparatus can be dis-
[illegible] apparatus can be switched
[illegible]me of the vapour
[illegible] drive.



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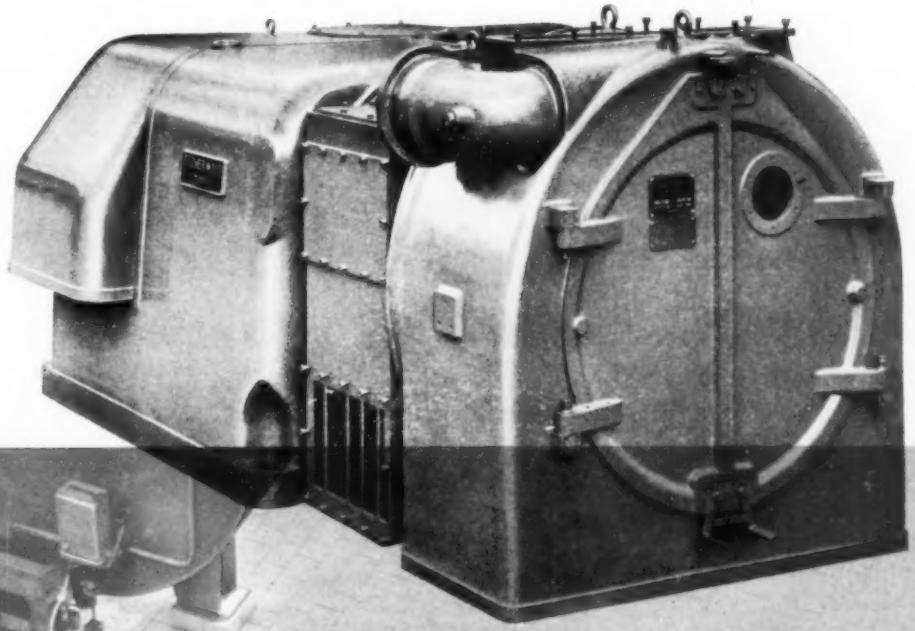

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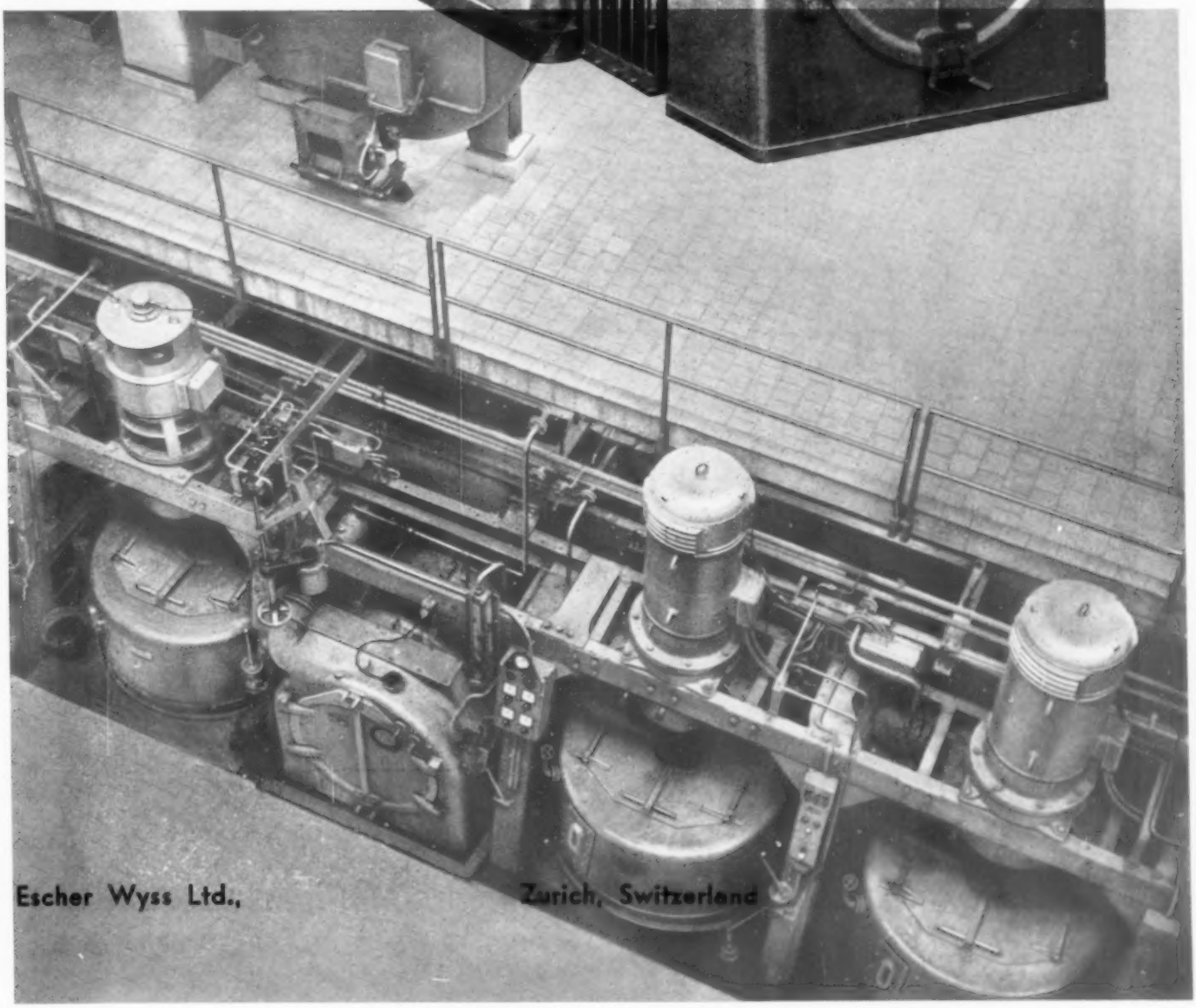

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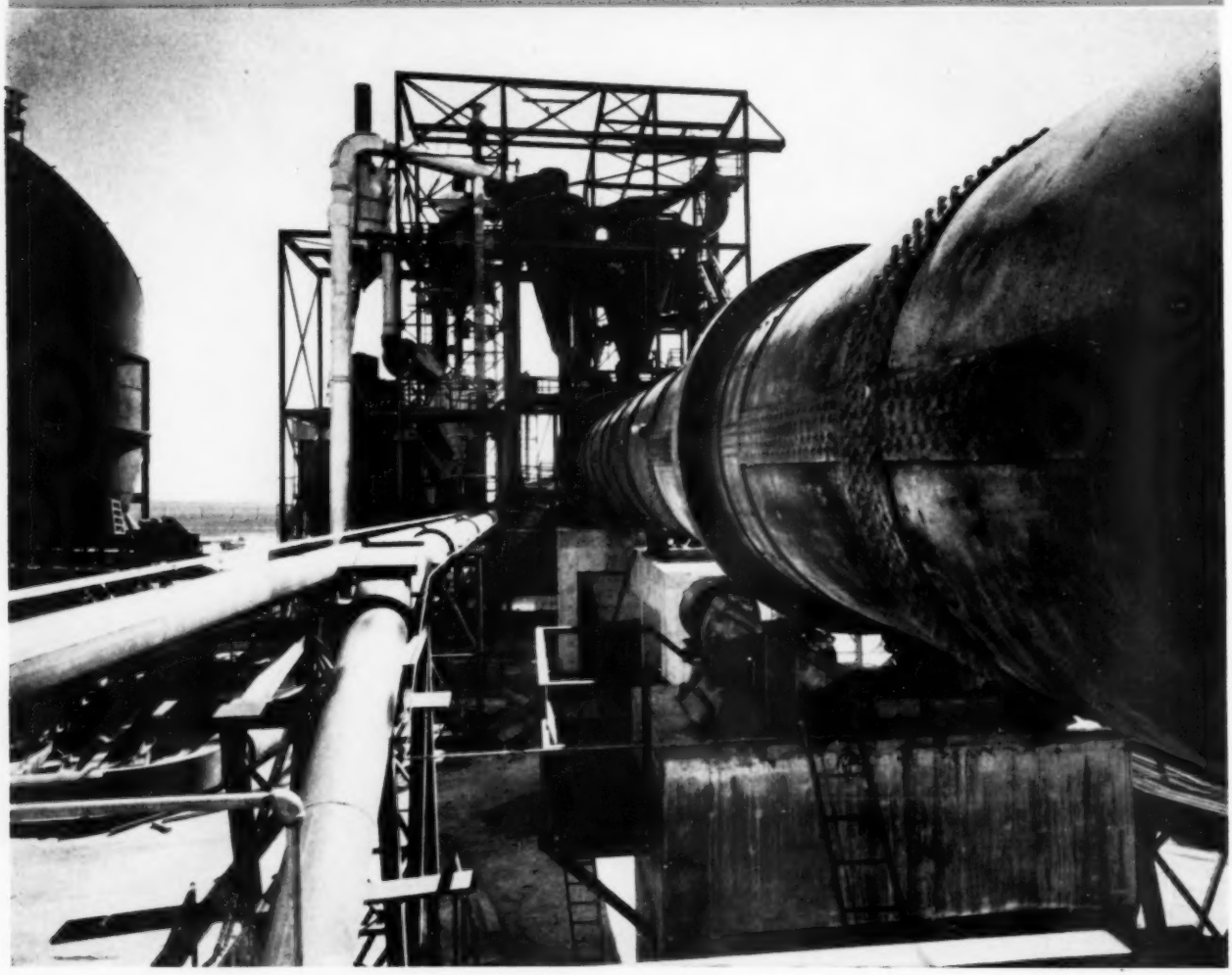

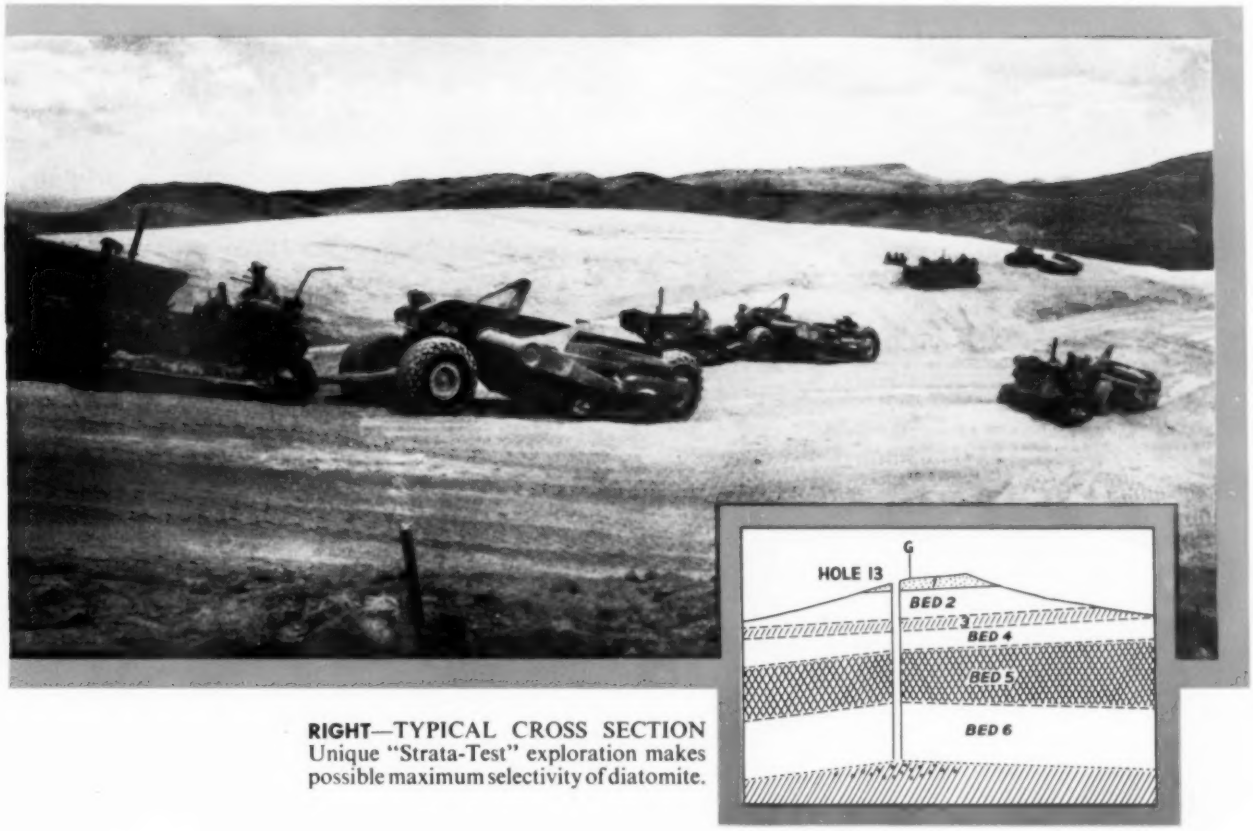

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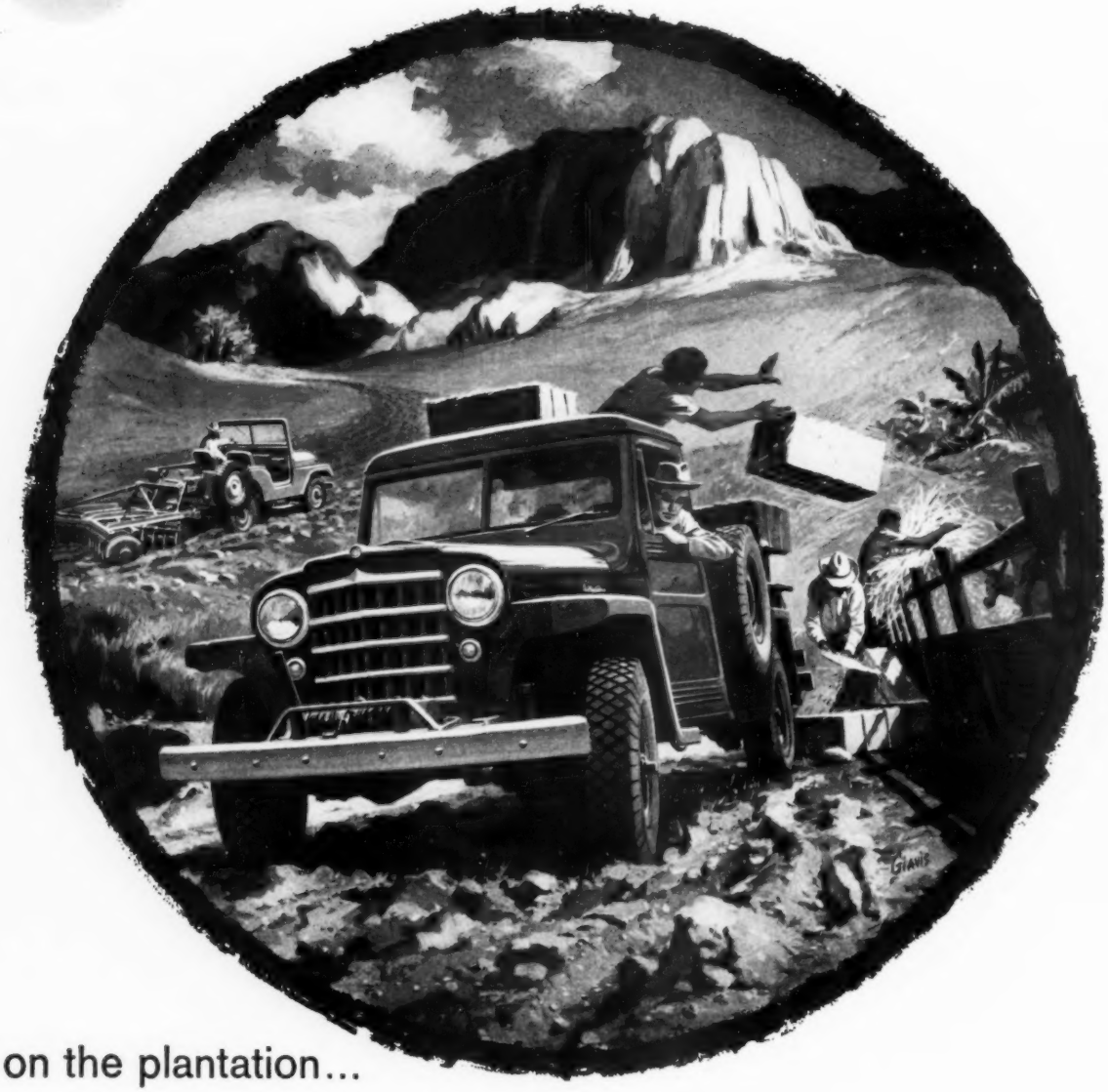

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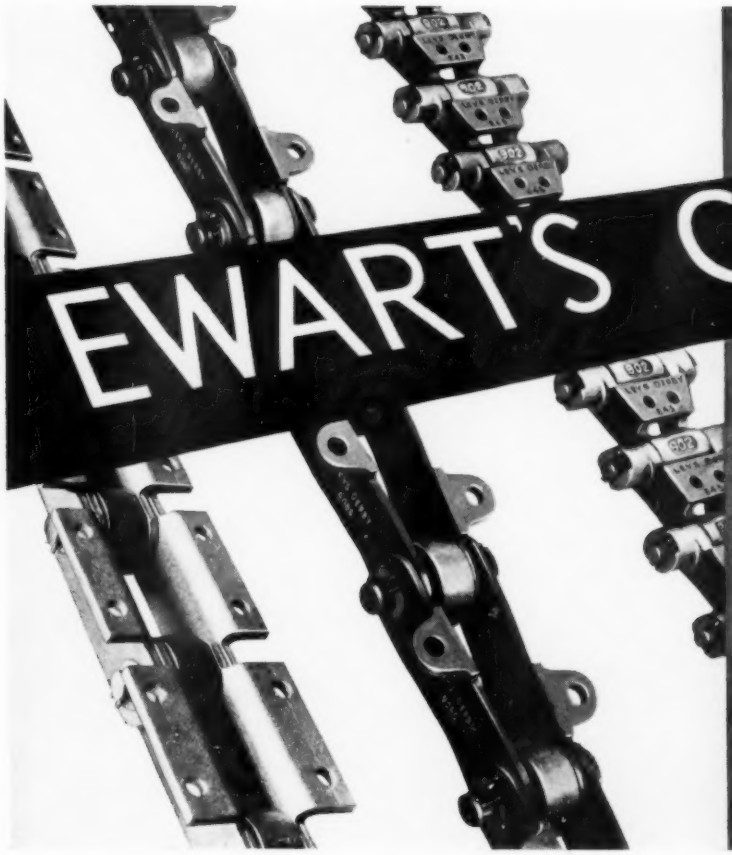

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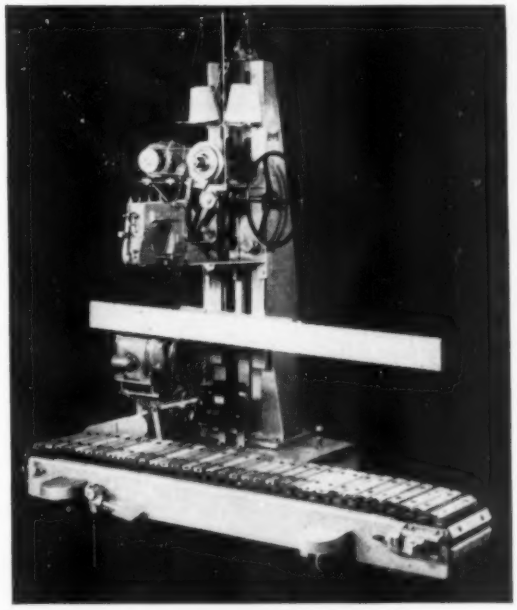
CONSOLIDATED Model 105 PORTABLE BAGGER

For

Either TEXTILE or MULTIWALL BAGS



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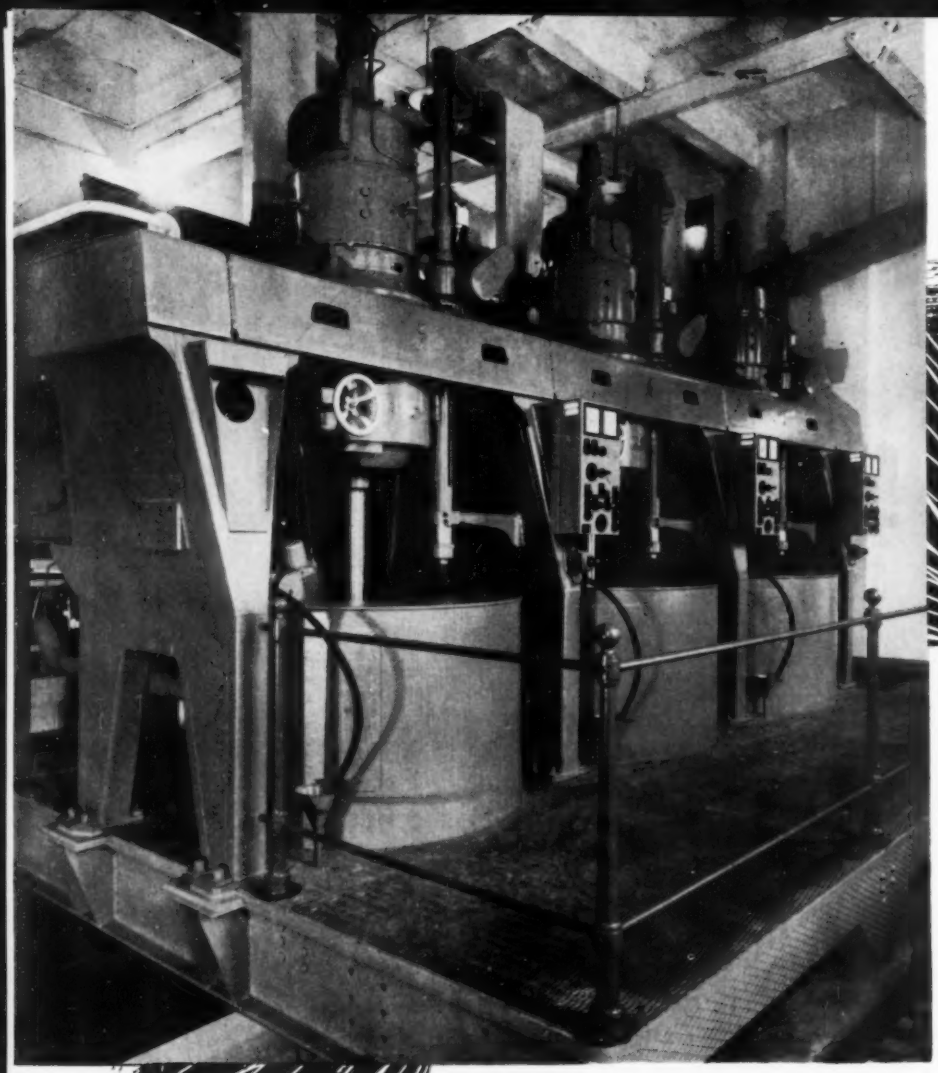

Battery of completely automatic centrifugals at Sucrerie de Colleville, France.

In beet and cane sugar factories and refineries there is always a tendency to modify processing in such a way as to obtain ever greater continuity. To carry this development a stage further, ASEA-Landsverk have brought out

The Fully Automatic Centrifugal

with Leonard Drive

This centrifugal offers the same advantages as the continuously-running, constant-speed machine with reference to low current consumption and low cost of attendance.

Its main features are

Stream-line Design
Variable Top and Charging Speeds
Entirely Electric Regenerative Braking to Current Peaks
Pneumatically Operated Charging Mechanism
Motor-operated Unloader
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ASEA

Västerås, Sweden

Yes! . . . it's ALL STEEL

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ALL STEEL
Shaft Mounted Drive

...Steel can "take it"!

STEEL frame ... of fabricated plate supports all rotating elements—provides double the ability of iron to maintain vital alignment of revolving elements, even under shock load or external impact.

STEEL housing ... will not fracture, serves only as protective cover and lubricant reservoir. Therefore, lubricant supply is safeguarded.

STEEL tie-rod and straddle-mounted tie rod brackets ... are fastened to heavy steel frame by steel bolts in double shear.

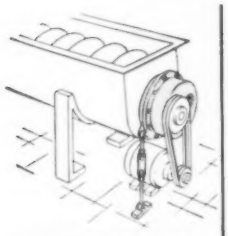
HP RANGE:
½ to 50 hp

RATIOS:
4:1—14:1—24:1 (or 20:1)

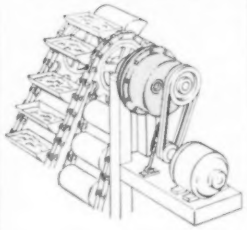
OUTPUT SPEED RANGE:
420 to 5 rpm

TORQUE RATINGS:
up to 31,500 lb-in

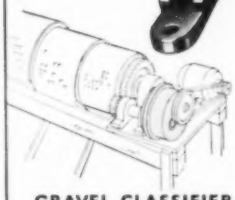
A FEW TYPICAL APPLICATIONS



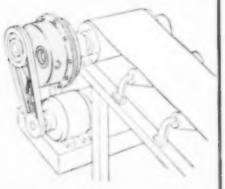
SCREW CONVEYOR



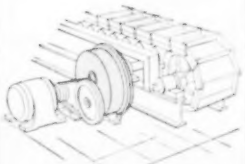
BUCKET ELEVATOR



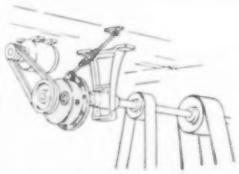
GRAVEL CLASSIFIER



BELT CONVEYOR



APRON FEEDER



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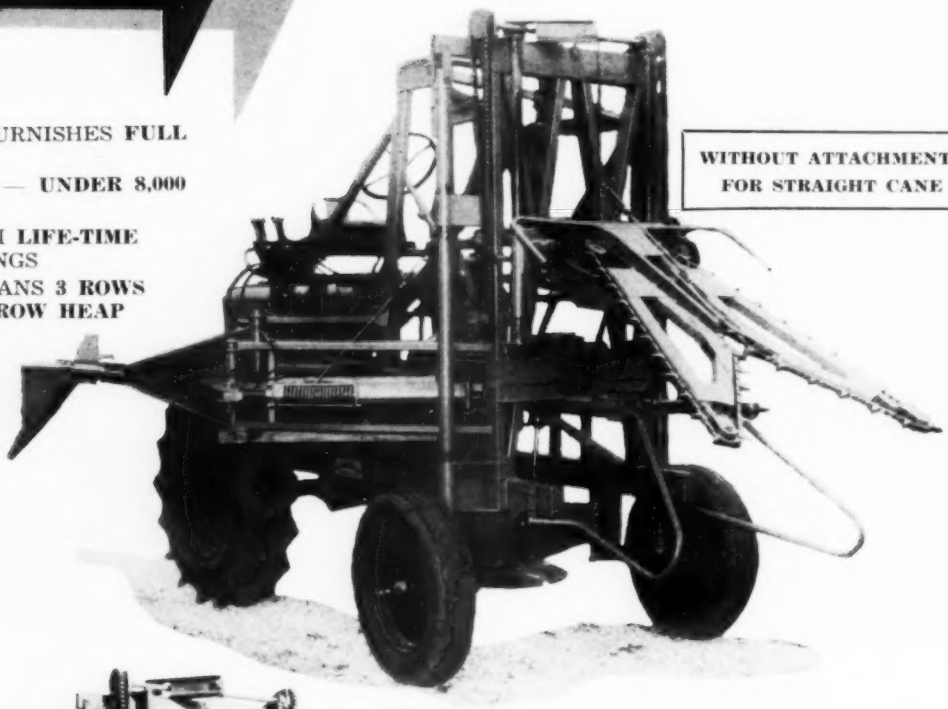

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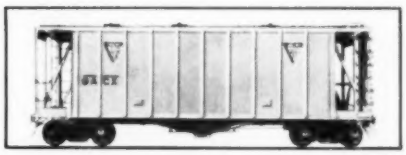

If you ship flour or sugar by ordinary methods, compare the above record with your own. Then see your nearest General American representative and learn why *it pays to plan with General American.*

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Offices in principal cities

**approximately 1,872,032 tons*

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No 3

THE PATENTED SYSTEM OF UNIT CONSTRUCTION

The motor, rotor, and basket are directly connected by the one spindle and are carried in one set of main bearings.

The minimum number of mechanical parts are used and are robust, accurately made, and designed to "go the nearest way to their jobs".

This basic system of suspension was introduced by us 30 years ago and has been consistently successful.

BROADBENT *Sugar* CENTRIFUGALS

THOMAS BROADBENT & SONS LTD · CENTRAL IRONWORKS · HUDDERSFIELD · ENGLAND

The world's largest manufacturer concentrating entirely on industrial centrifugals

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Refineries like these have found

ANGOLA® SUGAR FILTERS BEST!

Customer	*Location*	*No. of Filters*
Azucarera Merida	Merida, Venezuela	2
Central Santa Rosalia	Caracas, Venezuela	1
Central San Agustin	San Agustin, Cuba	2
Central Portugalete	Havana, Cuba	4
Central Porfuerza	Cardenas, Cuba	3
Central Roig	Yabuca, Puerto Rico	2
Central San Cristobal	San Cristobal, Cuba	6
Central Tanamo	Cayo Mambi, Cuba	1
Central Washington	Manacas, Cuba	2
Central Andorra	Artemisa, Cuba	4
Central Matilde	Chivacoa, Venezuela	2
Central Espana	Perico, Cuba	1
Central Santa Juana	Caguas, Puerto Rico	4
Ing. Pichichi	Guacari, Colombia	2
Ing. Mahuixtlan	Jalapa, Mexico	1
Jose Arechabala	Cardenas, Cuba	1
Western Sugar Refining Company	Mayaguez, Puerto Rico	1

Listed here are some of the refineries in Central and South America who have purchased Angola filters. Angola filters are used all over the world because of their fine quality and long life.

Angola filters provide high flow rates with maximum clarity at the lowest possible cost. Each leaf has a separate discharge and control valve, which provides complete control at all times. Angola filters are easy to operate and easy to clean. Specify Angola for the finest sugar filtration.

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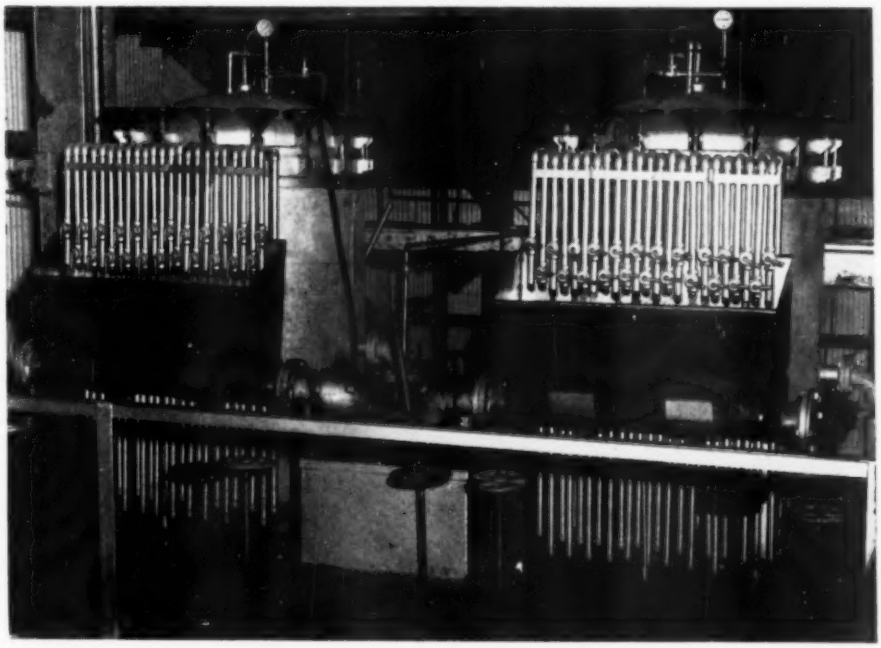
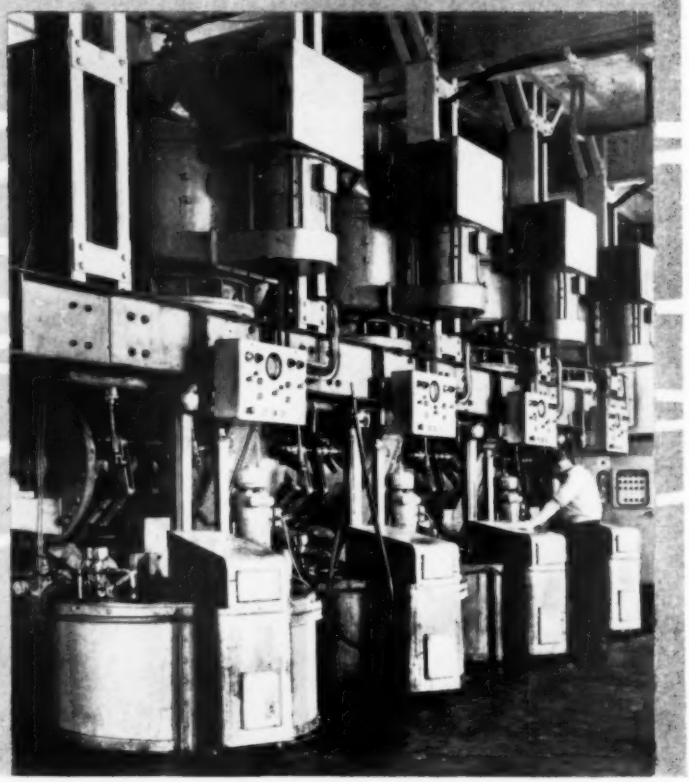
ANGOLA FILTERS



MACHINES OF WHICH YOU CAN BE PROUD . . .

4 - 48" x 30"

High Speed Electrically driven Centrifugal machines operated by Ward Leonard Control



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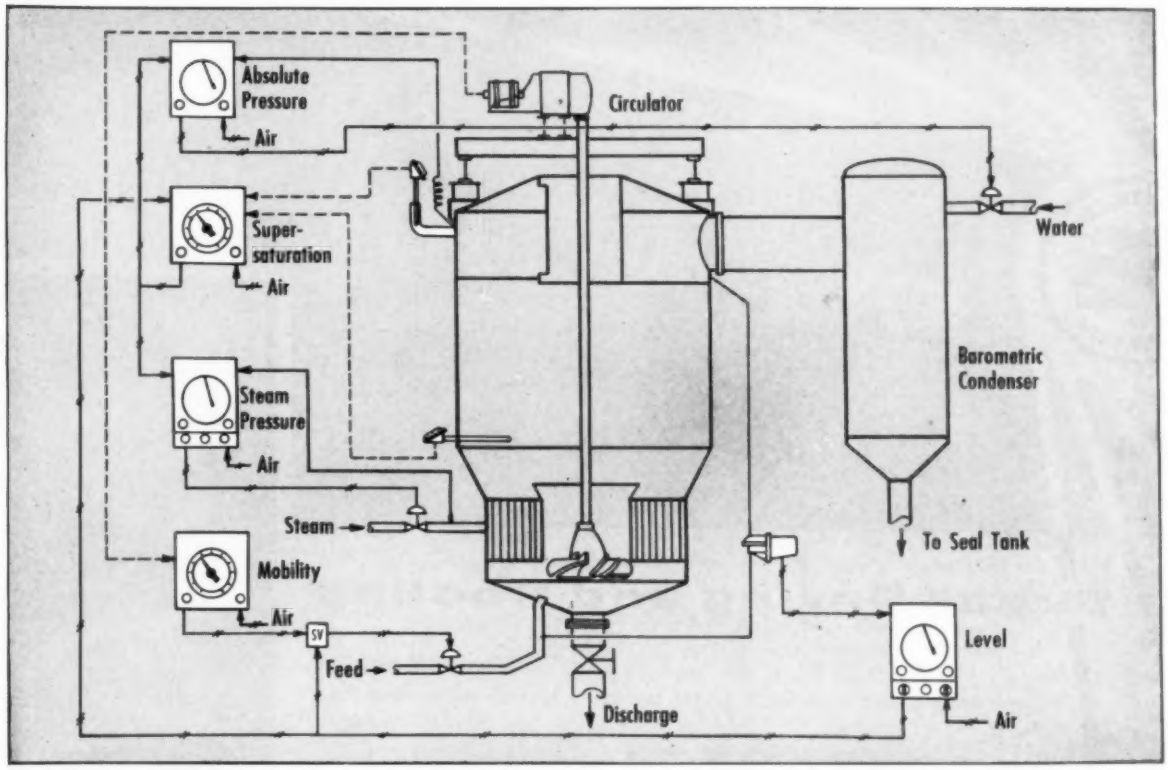


This is but one of several types of Honeywell control systems for vacuum pans. It is fully automatic, and measures and controls vacuum, steam, level, mobility and super-saturation, with programming and sequencing effected by changes in these variables.

Supersaturation controller—holds process within metastable zone

Absolute pressure controller—holds vacuum at optimum value

Mobility controller—regulates feed in proportion to pan tightness

Improve sugar quality with vacuum pan controls matched to your needs

Let Honeywell provide the *exact degree* of control you require for efficient, economical vacuum pan operation.

For example, you can have an expandable control system with minimum instrumentation, to which you can add at any time. You can have a complete, but manually operated, system which can be made automatic at any time. Or you can have a completely automatic system, with the process programmed and sequenced by separate instruments or by changes in the variables themselves. Choose either the widely used *ElectroniK* controls or miniature, pneumatic *Tel-O-Set* instruments.

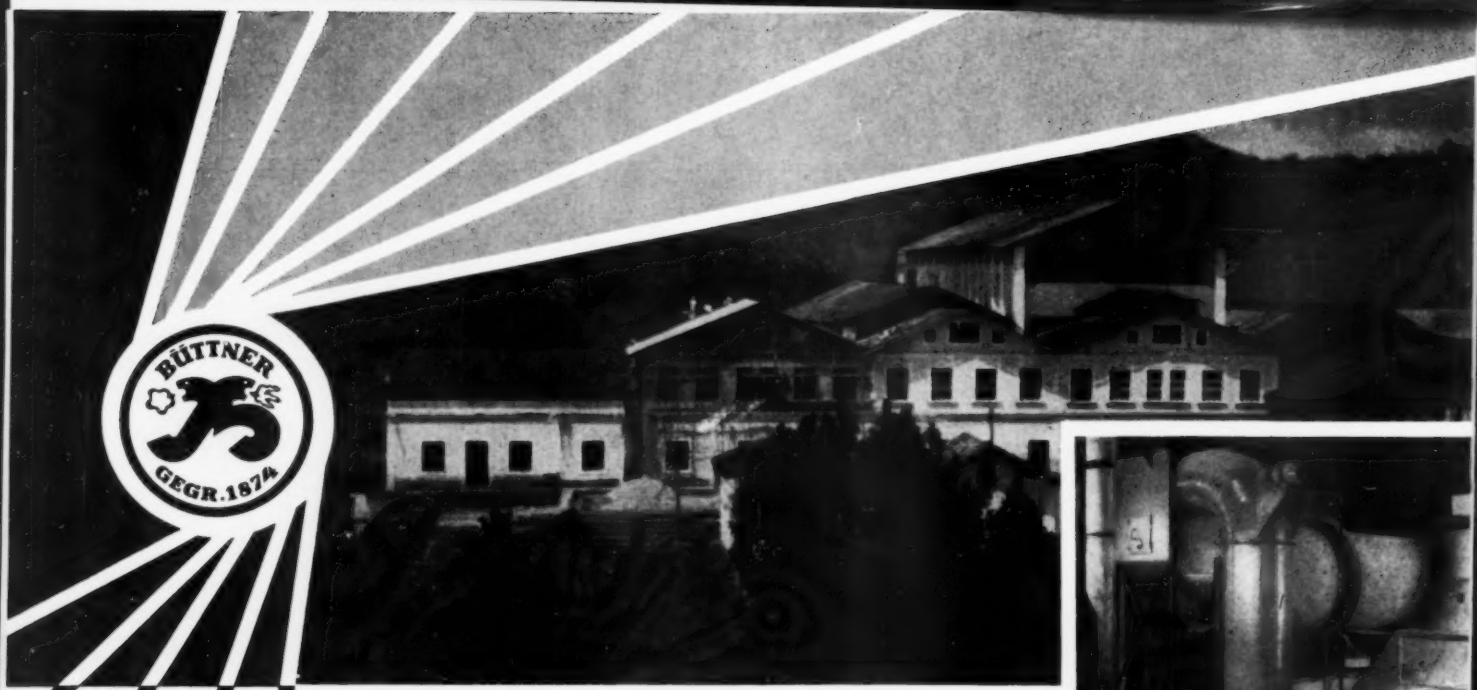
Whatever your choice, you can be sure your investment in Honeywell instrumentation will give you maximum returns in uniformly high-quality sugar, with savings in production costs.

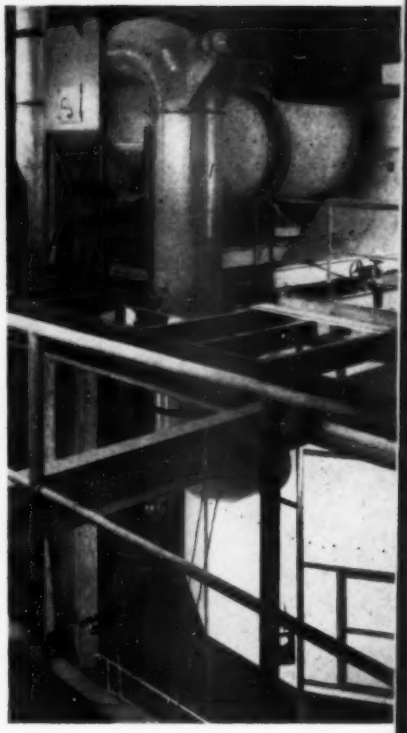
For details on instrumentation for vacuum pan operation and other processes, call your nearby Honeywell field engineer. He's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Aves., Phila. 44, Pa.

Honeywell

First in Control





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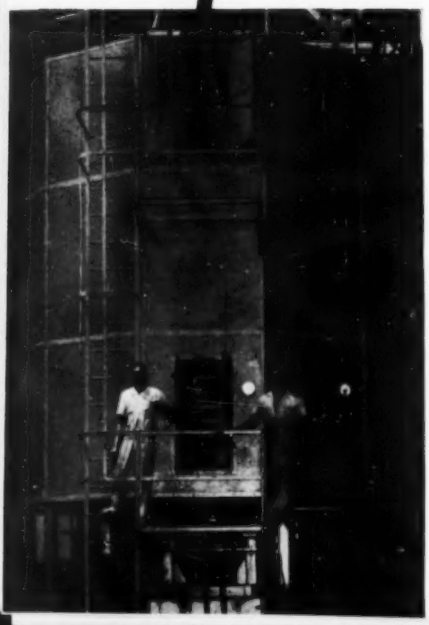
an exceptionally high quality, – crystals which keep their full brilliancy – and their sharp edges,

sugar that can be stored in silos or packed immediately in bags using an equipment of sturdy design which practically requires no attendance nor maintenance and, moreover, has a very low power consumption,

then the **Büttner Turbo Tray Drier and Cooler is the right solution**

Hundreds of Büttner Drier/Coolers are in successful operation in the most up-to-date sugar factories in Europe and Oversea Countries. More than 1300 Turbo Driers have been supplied by Büttner for various products. The number of our customers in Central and South America is increasing more and more. The Turbo Drier design was developed by Büttner's own Engineers.

80 years of experience in the Sugar Industry



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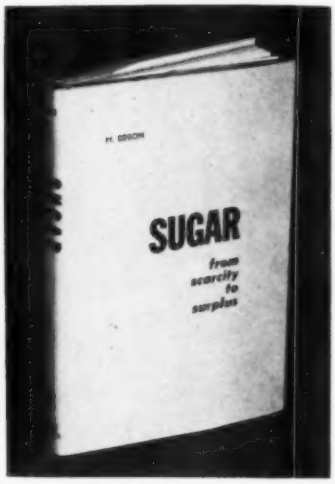

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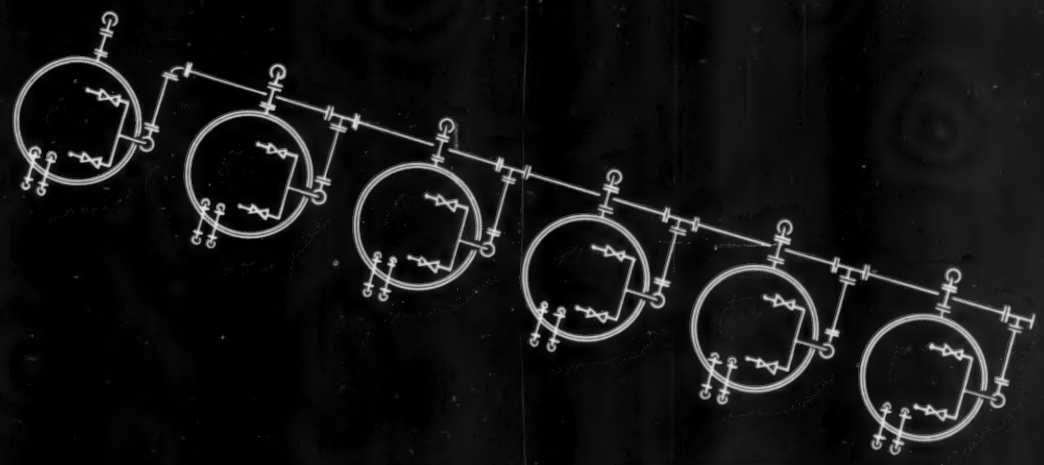

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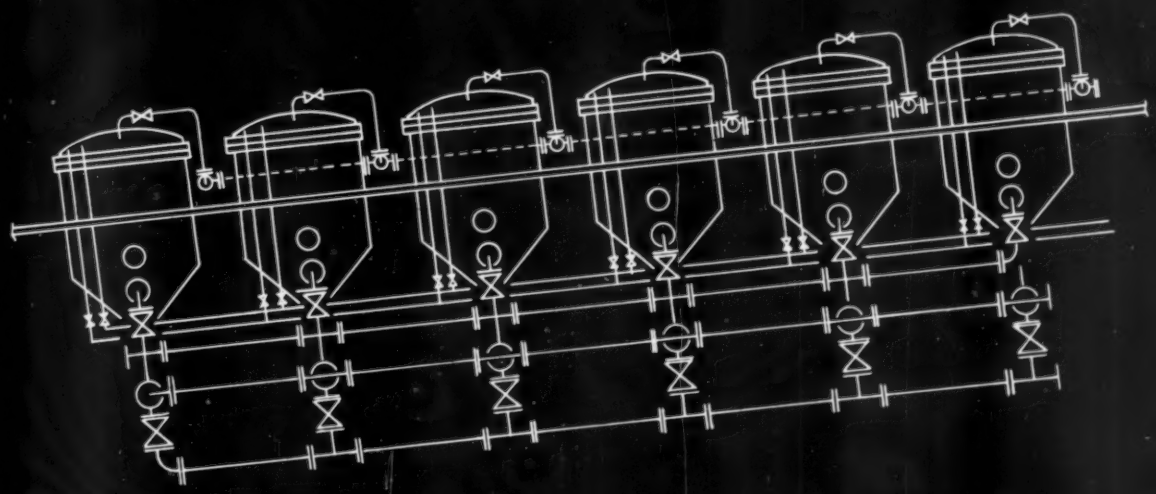

INDUSTRIAL equipment chosen for new *"Sugar Factory of Lebanon"*

The modern new "Sugar Factory of Lebanon", constructed in the Bekaa Valley of Lebanon by the well-known *Maschinenfabrik Buchau R. Wolf* of Grevenbroich-Neuss, West Germany, is an expertly designed combination beet sugar factory and cane sugar refinery.

After careful study and analysis, *six* INDUSTRIAL Vertical Chamber, Vertical Leaf, Bottom-Outlet Filters were chosen to handle the complete filtration job. This included handling the first and second carbonation of beet juices, as well as the first and second filtration stages of the cane sugar liquors.

Here, as throughout the sugar industry, INDUSTRIAL equipment was chosen because INDUSTRIAL'S specialized engineering ability and proven experience insured an efficient solution to a difficult two-faceted filtration problem.

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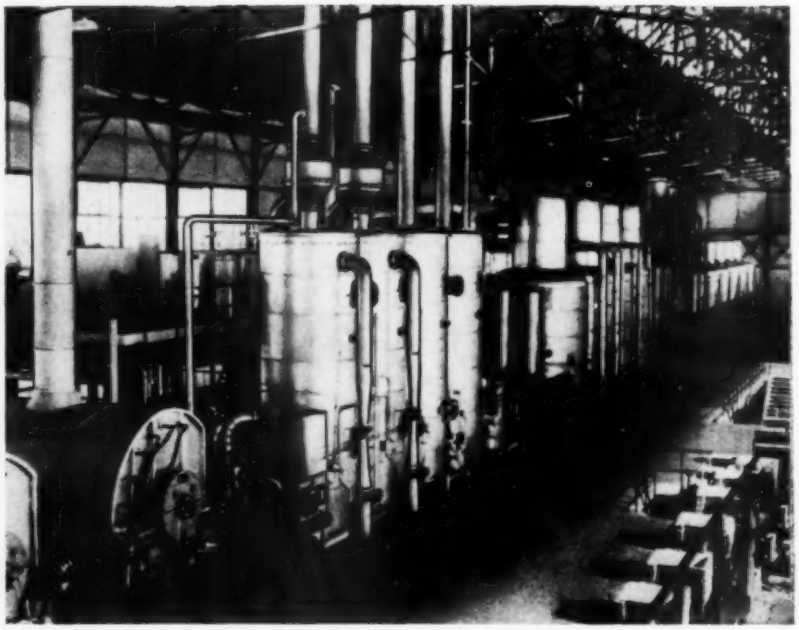

Inside view of the Malatya Sugar Mill (Turkey)

SUGAR FACTORIES ERECTED THESE LAST 10 YEARS

BEET

	T/day
France	
Artenay	1200
Cagny	800
Corbeilles-du-Gatinais	1200
Origny-Ste-Benoite	900
St-Leu-d'Esserent	1000
Algeria	
Mercier-Lacombe	300
Turkey	
Kayseri	1800
Malatya	1200

CANE

	T/day
Bolivia	
Guabira	1000
Brazil	
Jacarezinho	600
Matosinhos	800
Vassununga	1000
Uruguay	
El Espinillar	1200
Venezuela	
Ureña	700
Madagascar	
Ankaratra	2500
French Congo	
Niari	1150
Belgian Congo	
Uvira	1200
Thaïland	
Supanburi	1500

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it's filtered with CELITE

Cane sugar . . . beet sugar—both can be freed of thermophilic bacteria with efficient, economical Celite* filtration.

If you are refining beet sugar, filter the thick juice or standard liquor.

If you are refining cane sugar, filter the washed sugar liquor. In both cases, as an added precaution, polishing char or carbon liquors will eliminate the possibility of contamination from char filtration.

The result in either case is brilliantly clear liquid sugar that will remain positively pure as long as it is protected from recontamination by spores in the surrounding air.

Celite also gives you important advantages over other diatomites. First, its lower wet density provides greater filter surface coverage . . . six bags do the work of seven bags of other diatomites. Second, you get more consistent results because Celite is more uniform. Each bag is mined and processed at the world's largest and purest commercial diatomite deposit . . . and sped to you direct or through J-M's nationwide warehouse network.

For more information on how Celite filtration helps the sugar industry make better products at less cost, call your nearby Celite engineer or write Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

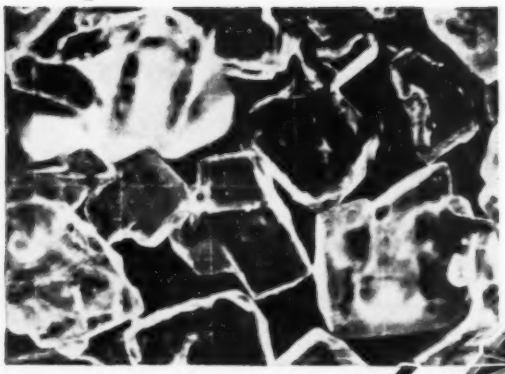
*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Johns-Manville CELITE

diatomite filter aids

JOHNS MANVILLE JM PRODUCTS

Bauduin



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a 67-year partnership in efficiency

In 1891, two C-E Boilers were ordered by the San Joaquin Plantation in Cuba. Steam generation has come a long way since then... and Combustion is proud that the constant development of its product has continued to contribute to the efficiency of the Cuban sugar industry.

In this period of 67 years, 103 C-E Boilers have been purchased by Cuban mills. 29 of these were ordered since 1950 ... and they alone are capable of generating 2,000,000 pounds of steam per hour! 21 are equipped with C-E Bagasse-burning Stokers, and 7 additional Stokers have been purchased separately for application to existing boilers or those of other make.

This long-term acceptance of C-E equipment in Cuba is typical of the response of leading sugar producers all over the world. If *you* are interested in any fuel burning or steam generating application — using bagasse or other fuels — in conjunction with any process in the sugar industry, including paper, hardboard or furfural production . . . call on the company with broad experience in your field. The Combustion representatives in your area will be glad to work with you or your consultants. Your inquiries, directed to our representative nearest you or to our Export Department in New York, will receive prompt attention.

associates, licensees and representatives throughout the free world

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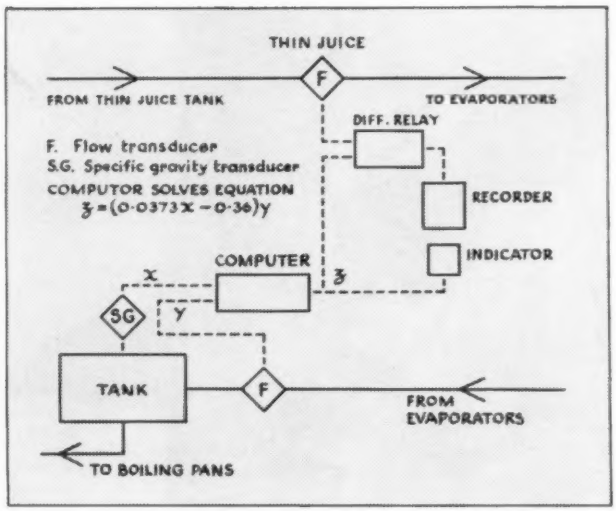
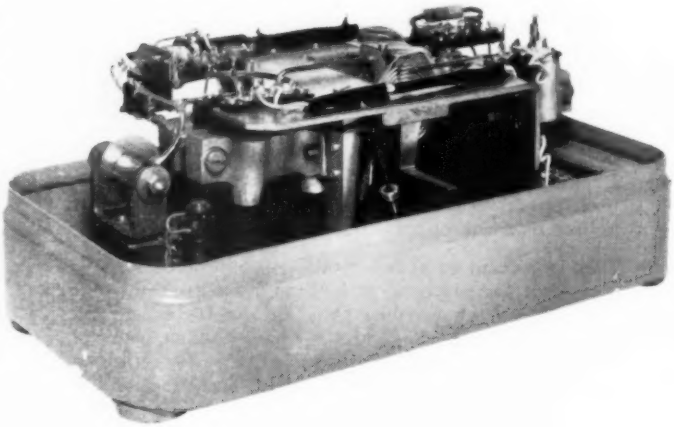
ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE

Simple check method on sugar losses in Evaporators gives greater plant efficiency



From input signals representing the thick juice flow rate and Brix degree THE EVERSHED SIMPLE ANALOGUE COMPUTER supplies a current corresponding to mass flow rate of raw sugar leaving the evaporators. The computer output indicated on the control panel is also used to supply the input signal to the differential relay as shown.

By the use of this simple method of calculation, sugar losses in the evaporators are kept under constant observation, thus leading to greater operating efficiency.



The Evershed Simple Computer is an analogue device operating on D.C. input signals (up to 6 inputs) and supplying an output current algebraically related to the signals.

EVERSHED SERVES INDUSTRY

Instrumentation & Controls Divison

Evershed & Vignoles Ltd., Chiswick, London, W.4, England. *Telegrams & Cables:* Megger London Telex
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7/101

Boost sugar yield at low cost!

EXTRAPOL

speeds and improves penetration of bagasse; cuts sucrose losses

Cut sucrose losses as much as 10% by increasing extraction rates an average of 0.5% . . . *without* major equipment changes! Use Wyandotte EXTRAPOL—a unique, 100%-active surface-active agent.

Added to the maceration water, EXTRAPOL provides faster, more thorough penetration of the bagasse. One mill grinding 500,000 tons of cane reports savings of over $15,000 a year with EXTRAPOL!

EXTRAPOL has proved exceptionally efficient under adverse operating conditions such as these!

- Three percent or more sucrose in bagasse
- Below-average percentage of maceration water to cane
- Overloaded juice heaters or evaporators
- Lack of time in the mill train for maceration water to penetrate the bagasse blanket before it enters the mill rolls

Putting EXTRAPOL to work costs little: just a small tank and inexpensive proportioning pump are needed. And use-cost is low, too—quantities average 21 pounds per thousand tons of cane.

STERI-CHLOR 4X

reduces sugar inversion; increases yield per ton of cane ground

Increase sugar yields as much as 3½ tons per 1,000 tons of cane ground! How? Reduce sucrose inversion and prevent dextran infection with STERI-CHLOR 4X, Wyandotte's exclusive anti-enzyme agent. Users report increased profits up to $100,000 annually!

Here's how STERI-CHLOR 4X works: By inactivating sucrose-inverting enzymes in mill slimes and stale bagasse debris, it reduces juice contamination . . . gives minimum glucose co-efficients.

And by killing microorganisms at infection points in the mill train, STERI-CHLOR 4X controls Leuconostoc infection, the cause of dextran problems.

STERI-CHLOR 4X is noncorrosive; cannot harm metals or equipment. And only low-cost equipment is needed to put this potent germicide to work for you.

INTERESTED?

Want more facts on the advantages of using STERI-CHLOR 4X and EXTRAPOL? Then fill in and mail the coupon below . . . *today!*

Wyandotte CHEMICALS CORPORATION J. B. FORD DIVISION

Wyandotte Chemicals Corporation
Export Department 3059
Wyandotte, Michigan, U.S.A.

Gentlemen:

Please send me details on how STERI-CHLOR 4X and EXTRAPOL increase sugar yields. I would prefer data in ☐ English ☐ Spanish.

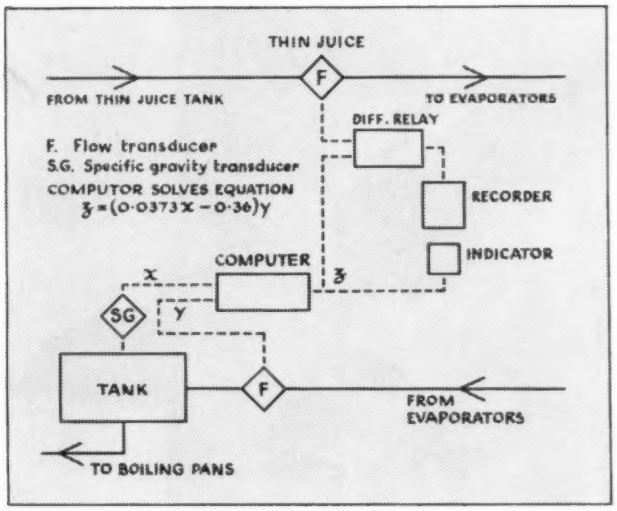
Name.....Title..... Firm.....

Address .....

City.....State.....Country.....

NOTE: Attach details about your mill's operation for more specific information on what these Wyandotte products can do for you.

Simple check method on sugar losses in Evaporators gives greater plant efficiency



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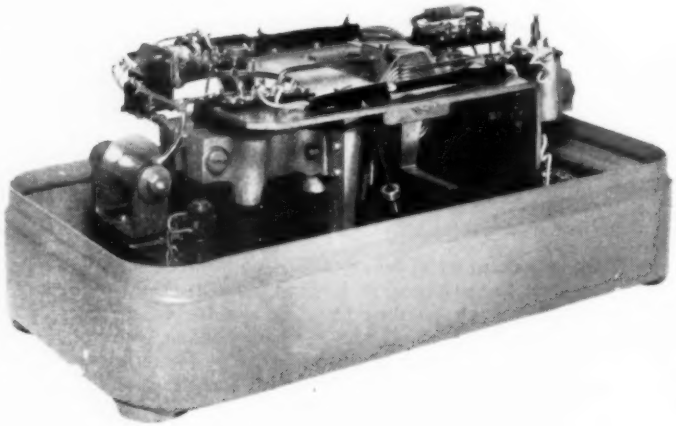

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This is only one example of the care that is taken to ensure that when you buy Fletcher sugar machinery you are buying the best.
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SUGAR

OCTOBER, 1958

A Message Of Welcome To The Visiting Delegates

By Guillermo E. Ochoa

President, Asociación de Técnicos Azucareros de Cuba

As president of the Association of Sugar Technologists of Cuba, I take this means of extending to all of our foreign delegates a hearty welcome to the 32nd Conference which will be held in the city of Habana during the 6th to the 9th of October, 1958.

Once again the Association is fulfilling the mission for which it was founded in 1927 by a group of valiant pioneers—Cubans and foreigners—to promote, by means of annual conferences, free discussion of the technical problems that confront the sugar cane industry.

Guillermo E. Ochoa

The interchange of ideas and propositions, the promotion of personal friendships, and relations between colleagues in different countries, are among the important objectives which these annual conferences of A. T. A. C. are designed to accomplish. One result of this policy is that we now count among us more than 300 members who live beyond our national territory. Among them are members from countries as different as India, Brazil, the U. S. A., Mexico, Puerto Rico, etc.; among them are many who are present at our annual conferences, and there are others who send their work to be presented at these conferences, and in general they form a group which is unified by means of our monthly Bulletin and our annual Memorias.

The times in which we are living, and which are characterized by technological developments beyond anything that might have been anticipated, have made us all conscious that the exchange of knowledge is absolutely necessary and useful for economic development and for elevating the standard of living of backward peoples. In this connection we can reflect on the fact that the sugar industry, from time immemorial, has promoted the interchange of knowledge and ideas among all the sugar producing countries of the world, and that the sugar technologists of these countries have not been behind in this labor of collaboration and divulgation. The Association of Cuban Sugar Technologists has discharged this function with distinction, as may be verified by leafing through our collection of Memorias; in these 30 volumes are to be found an immense number of contributions signed by distinguished sugar technologists of different nationalities and origins. Everybody knows that there are no "professional secrets" among sugar technologists; on the contrary, when a procedure has accomplished results in a factory, in a field, or in a laboratory, the technologist who has developed this procedure is prompt to make the fact known as quickly and as fully as possible. If it be said that this is due to the fact that in the sugar industry there is an absence of the sharp competition that exists in certain other national and international industries, it still remains a fortunate circumstance that sugar technologists throughtout the world have been ready, without reserve, to interchange their knowledge and ideas. And it is in this open, frank and sincere spirit that we extend a welcome to our companions from the friendly peoples who will visit and honor us by their presence at the 32nd Annual Conference of A. T. A. C. We extend this welcome through the pages of SUGAR Y AZUCAR which, as in 1957, has had the good will to dedicate to the Association of Cuban Technologists the October number of its bilingual journal, and in that manner to make its contributions to this interchange of ideas and knowledge throughout all the sugar producing areas of the world.

Welcome to our friends!

PRESIDENTIAL ADDRESS

Por Guillermo E. Ochoa

President

Asociación de Técnicos Azucareros de Cuba

THE Association of Sugar Technologists is now open for its 32nd Annual Conference. In the name of the Executive Committee over which I preside, I extend the warmest welcome to all our associates, Cubans and foreigners, and to the distinguished personalities who have honored us with their presence in this simple yet transcendent opening ceremony.

It is almost a matter of routine that the function of the president of the Association on this occasion should be to outline the merits which our cherished Association has won in the field of sugar technology, and the influence it has had on the economy of our country; but I now take occasion to mention not only the merits which we have so laboriously gained as the result of our efforts, but also to refer to certain shortcomings of our organization which I will do in a mood of constructive criticism.

To outline the merits of the Association of Cuban Sugar Technologists is an easy task. The small group of technicians, who in the year 1927 founded our Association, has in 31 years of persistent labor and endeavor grown to be an imposing organization, with many permanent roots in our community.

All of our organizations have their histories, but few of them have a history rich enough to match the thirty volumes of our *Memorias* and the uncounted volumes of our *Official Bulletin*. These volumes contain hundreds of technical and scientific works, written by our associates with the sole desire to improve the procedures and technicalities in the production of cane sugar in all of its phases. And all these works have been presented in our annual conferences or published in the *Official Bulletin* with the maximum disinterestedness of their authors, and with the sole and simple aim of making a contribution that will lead to an improvement in the process of manufacturing sugar. And herein, ladies and gentlemen, lie the roots of the strength of the Asociación de Técnicos Azucareros de Cuba, its disinterestedness and in the disinterestedness of its associates. Our labors have never been biased toward utilitarian objectives. Our discussions have always been constructive, never sterile. We have always striven for the good, without particular reference to those who might benefit from our labor. We have served the commonalty, and here is our work to prove that we have done so.

However, every organization needs to renew itself, to create new objectives and to attain new and fuller realizations. In the present organization of A. T. A. C. there are two circumstances which strongly present themselves to our attention, and which we desire to bring into view, taking for granted your gracious indulgence.

The first of these circumstances is the number and composition of our associates. We now count 1,120 regular members and 112 protecting members. Among the 1,120 regular members are approximately 800 Cubans and 300 foreigners. And here is an anomaly: About 27% of our regular members are foreigners! We are proud to be able to count in our ranks such a large number of foreign members, but we cannot overlook the fact that we have only 800 regular members of our own nationality.

We have carefully studied this problem and its solution, which is that an increase of Cuban members depends on various factors which we will now proceed to enumerate.

Dates of the Annual Conference. Under the rule existing prior to this Conference the annual conferences have been held during the months of November and December of each year. This is the period which coincides with the period of greatest activity in repair work at the sugar centrals. The chief machinists and the personnel whose presence is indispensable at the factory for this repair work cannot attend these annual conferences which are the life and soul of our Institution. The result is that the number of chief machinists who are members of the Association has been steadily decreasing.

This year, in accordance with a resolution of the General Committee of the members, we are meeting at a date that is far earlier than it has ever been in the past, and we hope that with this change the reason why the chief machinists have been unable to attend our meetings will have disappeared, and this should lead to an increase in the members of that Section.

Delay in Publishing the Memorias. This matter, which is of long-standing, has been a source of complaint and inconvenience among the members, and is reflected in a smaller number of new applications for membership and a larger number of withdrawals. The Executive Committee, of which I am chairman, has done everything possible to accelerate the appearance of the last *Memoria*, and strenuous efforts are being made to bring them out in a minimum of time, so that the works published in these *Memorias* will not be out of date because of delay in their publication.

As a means of attracting a large number of members to our Institution, it will be necessary to raise the technical level of the works presented at our Annual Conference, not only as regards their form, extension, presentation, and conformity with the existing system, but also in their content, originality, and intrinsic value.

Enlargement and Improvement of the Bulletin. The *Official Bulletin* of the Association of Cuban Sugar Technologists is the most revelant means of intercommunication within the Association and its membership. It is necessary to acknowledge that its present form might be largely improved. If possible, its format should be changed and the quality of the works published in it should be improved. For accomplishing these aims, it will be necessary for the members to cooperate by sending in original work of high technological worth. It would be of distinct advantage to name a permanent director for the *Bulletin*, rather than to name a new one each year as is now the practice. This permanent director, chosen from among the large number of capable men included in our Institution, would have full responsibility for the publication of the *Bulletin*. A dynamic *Bulletin* with a genuine technological content, will be our most effective means of attracting a larger membership to A. T. A. C.

We are sure that by materializing the foregoing ideas, and with the help of every member of the Institution in a personal labor of leadership—which is the most important of all—we may increase the number of regular members, and at our next

annual conference bring our regular membership to at least 1,000; this is a realistic figure, and it is possible to attain it.

We should not fail to inaugurate, as soon as possible, the second Exposition of the Sugar Industry. The success of the first Exposition in 1956 is still fresh in our memories. Events of this nature are excellent means for divulging the objectives of the Association, and will effectively serve to increase the number of our associates.

There is another circumstance in the present organization of A. T. A. C. which is constantly on our minds. At the present time the funds of the Association fall into two categories: the annual dues paid by the members and protective associates, and gifts or economic assistance contributed by various institutions. Those institutions which help the A. T. A. C., and without whose assistance we could not meet our budgetary costs, include the following:

The National Association of Hacendados, with an annual contribution of $4,200; the Ministry of Agriculture with $2,600 annually, and the Association of Colonos with an annual quota of $100.00. And we wish to emphasize the fact that the powerful and flourishing Association of Colonos of Cuba is contributing only $100.00 a year to sustain the A. T. A. C.!

Naturally, we do not wish to criticize those who help to benefit and to sustain us; but allow us to point out that among the Sections that compose our Association, the Agricultural Section is one of the most numerous and the most enthusiastic. On the whole, during our past 31 conferences this Section has presented 350 technical works. These works have been signed by the most distinguished Cuban and foreign technicians, among whom we may mention the names of C. E. Beaucham, Federico Poey, H. C. Sorenson, Fernando Agete, Luis C. Scaramuzza, Roberto Barreto, Alfonso Fors, and other valiant personages whose names at the moment escape us. And now it may be asked: who has been receiving the benefits of these experiences, this alertness, and the efforts of these numerous and notable technicians? In the main, and by a wide margin, it has been the Cuban Colonos. We sincerely believe that the Association of Colonos of Cuba is under a moral obligation to increase its contribution to our Association, and I take this occasion to extend a cordial invitation to its Executive Committee to give us more generous assistance, in the virtual certainty, that this assistance will be recompensed by more and better benefits to its own membership.

Before I come to a close I wish to express our most profound thanks to our companion, Honorary ex-President of A. T. A. C. and ex-Minister of Agriculture of the Republic, Sr. Fidel Barreto, to whose efforts we owe the free postage granted to the Association by Decree No. 2106 of June 4, 1958.

Also, we wish publicly to give our thanks to the journal, SUGAR Y AZUCAR, which has dedicated to our Conference its October number, and to the magnificent Hotel Habana-Hilton, which has supplied every kind of facility for our 32nd Conference, which we now begin.

Many thanks!

Highlights of the 32nd Conference

Association of Cuban Sugar Technologists

By H. Ramos Grau

THIS year the Association of Cuban Sugar Technologists will celebrate its 32nd consecutive annual conference from the 6th to the 9th of October. It is the first time in the history of the Association that this annual reunion has been scheduled to take place so early in the year. This is due to a feeling among a large number of the members that this earlier date will make it more convenient for the members of the Mechanical Section to attend. Otherwise they would have to remain at the factory to complete preharvest repairs.

Should the Asociación de Técnicos Azucareros de Cuba change its name? An opinion is being expressed by a numerous group of sugar technologists that the present name of the Association connotes the idea of a limitation of its field of action to problems directly related to the production of cane sugar, but the fact is that at no time has the A.T.A.C. limited its interest solely to the sugar industry; on the contrary, from the time of its first meeting in 1927 it began to consider all matters of a general nature affecting the various sectors of the industry, including the possibility of utilizing the secondary products from the sugar cane as bases for new industries. Proponents of the idea suggest that the new name should be changed to Asociación de Técnicos Azucareros de la Caña de Azúcar (Association of Sugar Technologists of Sugar Cane). The core of this suggestion is that the sugar cane is the prime raw material from which are derived raw sugar, refined sugar, bagasse paper, alcohol, etc. The new name would then be analogous with that of the International Society of Sugar Cane Technologists. To judge from the current favorable opinion, it seems likely that the proposition will be acted upon this year by the General Council.

All the transactions of the Conference this year will take place in the new and splendid Habana Hilton Hotel.

As in former years, the sugar technologists will visit several of the many important industries in the environs of Havana, where they will be received as honored guests.

The opening ceremony of the Conference which will take place in the morning of the first day, and its closing in the evening of the last day, will be held in the Grand Pavilion of the hotel.

The working sessions for presentation and discussion of numerous papers on agriculture, fabrication, engineering, by-products and nutriology will continue from the 6th through the 9th of October, from 9 to 12 A.M., and from 2 to 6 P.M., except that Monday morning will be given over to the opening ceremonies, and Wednesday afternoon to visits to industry.

The General Committee will meet at nine o'clock Thursday to consider the conclusions from the works that have been presented, to review the actions of the Association's various commissions, among others those relating to the international laboratory methods for sugar factory control and those of the International Commission for Uniform Methods of Sugar Analysis. The result of the election for the Executive Committee, which is to guide the destinies of the Association during the year which begins on October 10, will also be announced.

In the Pavilion at 9 P.M., Thursday, the ceremonies of the 32nd Annual Conference of the Association will be held. At this time the gold and silver medals and the corresponding diplomas will be awarded to the President and to the retiring Secretary and Treasurer. Diplomas for meritorious services they have rendered will be awarded to the Section Presidents and other members.

The Association has instituted various marks of distinction for those members who have contributed to the prestige of the Association each year, or who have faithfully and unselfishly discharged various tasks assigned to them, and to persons who have contributed to the moral or material success of the Conference in one way or another.

Among these honors are "Medals of Gold and Silver", Diplomas of "Honor", "Merit", "Excellent Work", "Distinguished Service", "Recognition", and "Letters of Thanks".

Those receiving awards include the following:

President of Honor: The diploma of Honorary President of the A.T.A.C. is awarded to our distinguished companion, Walter E. Dickinson.

Honorary Life Members: The General Committee has authority to bestow this title on all Founding Members the distinction of Life Membership with all the rights of active members. Those so designated will be George W. Connon, now residing in Mexico City; Walter E. Dickinson, retired and residing in Cuba; Fernando Guerrero, residing in Cuba and Director of the factories of Garía Díaz Ltd.; G. C. Kaar, presently retired and residing in San Diego, Calif.; and George W. Magalhaes, a former official of Westinghouse International, now living in New York.

Gold Medal and Diploma of Honor: Francisco Santa María, President 1957.

Silver Medal and Diploma of Honor: Pablo Lancella Sánchez, Treasurer 1957.

Jorge C. Tarafa, the Secretary, will not receive this award this year because he has been elected for another term.

Diploma of Honor: Maxiliano González, Coordinator General.

Agriculture: Engelberto Bolaños, President.

Fabrication: Lucio Rodríguez, President.

By-Products: Juan Romagosa, President.

Engineering: Ladislao Barreto, President.

Nutriology: Tomás Durán Quevedo, President; Tomás Fandiño, Director of the Official Bulletin.

Commemorative Diploma: In commemoration of their 25 consecutive years as active members of the Association.

Protective Members: Central Jaronú, Cía. Azucarera Atlántica del Golfo; Dorr-Oliver Inc.; Marcelino García-Beltrán, Punta Alegre Sugar Sales Co.

Senior Members: Juan M. Clark, Enrique F. Echenique, Manuel Estrada Pérez, Stewart Macfarlane, Cecil W. Murray, Jorge de Oña, I. J. Santamaría, Mariano Travieso Fundora, Ramón Villageliú.

Diploma of Merit: For labor performed during 15 consecutive years within the Association.

Protective Members: Cia. Azucarera Elia, Cía. Azucarera Progreso, S. A., José Arechabala, S. A., Sucro-Blanc, Inc.

Regular Members: Humberto Aguilar Díaz, Virgilio Alvarez Menéndez, Manuel Arias, Jr., Manuel F. Arias, Roberto Bernal Cerice, Alberto Betancourt Castaño, Nicolás Betancourt Castaño, Alfredo Blanco Rosell, Joao Bravo Caldeira, José Luis Bustos, Francisco Cabrera Abreu, Andrés Calleja Rabassa, Ignacio Carvajal Olivares, Abdón Coello Garcés, Cía. Agrícola Cubitas, S. A., César B. Cueto Robayna, Rogelio Curbelo Hernández, Laurence H. Daniel, Bernardo Díaz de Arce, Miguel Dufau Zayas, Héctor R. Elizondo, René V. Escalona, Oscar A. Espinosa, Tomás Fandiño López, Fermín Fernández, Herminio Ferreras, Rolando Figueroa, Rigoberto Flores Pons, José Fuentes Allegue, Edgardo F. González Alonso, José D. González Verdeja, Roberto González-Rivera, A. J. Keller, Alberto Lancaster Jones, Marcelino Laserna, Arturo López Alcazar, Antonio Matos Sánchez, J. L. Matthews, Helio Morganti, Andrés Morales Hernández, José C. Ney, Faustino Ortíz Velaz, José Luis Otero, José M. Pascual, Juan Pedemonte, Cecilio de la Peña Valle, Tomás Pita de Hombre, Severo Quiñones Castañeda, Juan G. Real, José Luis Rodríguez Maribona, Ramón M. Rodríguez, Juan Romagosa Cruset, Alberto V. Roqué, Manuel Salinas Autré, Julio Sánchez G., Marco A. Sánchez, Francisco Santa María, Francisco Serna Silva, Miguel Solaún Grande, Antonio Sotolongo, Jorge C. Tarafa, Eugenio Tormes Gómez, Aquilino Torres, Plinio Torres Parapar y Alfred L. Webre, Jr.

Diploma for Major Work: A group of members of A.T.A.C., comprising both individuals and organizations, have established medal awards and diplomas for the best work presented at the Annual Conference in each of the various Sections. The following awards are being made.

Agriculture: The "Ingenio La Joya" prize for a work entitled "Results Obtained in Comparative Studies Made by the Sugar Cane Experiment Station at Jovellanos during the 1957 Season," Roberto Barreto Domínguez, author.

Fabrication: The "Diamond 72" prize for a "Study on the Preclarification of Juice of Medium Acidity," José Ramón de la Vega, author. The "Oleos, S. A." prize for an "Experiment on the Purities of Low Grade Massecuites," Raúl Esparza Tabares, author.

Engineering: The "Guillermo E. Ochoa" prize for "The Proper Analysis of Bagazze," Lesmoir R. Bliss, author.

Diploma for Distinguished Services: For their accomplishment in presenting no less than ten new members during the Conference year to Arnaldo Ricciardi and Lucio Rodrígues.

Letter of Thanks: This award is made to persons and organizations who have devoted disinterested moral material, and/or personal support to the success of the Annual Conference of A.T.A.C., or to activities supported by the Association.

For having fulfilled the invitation of the Association to deliver his address entitled "The Work Accomplished by the Cuban Institute of Technological Investigations Since its Foundation," this distinction is awarded to Emiliano Ramos.

■

Puerto Rican Sugar Technologists To Meet In San Juan

A program of exceptional interest has been arranged for the Annual Meeting of the Puerto Rican Sugar Technologists Association featuring the effect of field mechanization on agricultural practices and on the operation of the mills. The Annual Meeting will be held at the Caribe Hilton in San Juan on December 5th and 6th. On the first day of the two-day session the agronomists and the mill groups will meet separately. Agricultural engineers will hear papers and discuss cultivation methods, various mechanical harvesting systems and maintenance of field machinery. At the same time, the mill group will cover problems of additional dirt and stones in the mill resulting from mechanical harvesting and loading, increased milling to meet the demands of mechanization, cane washers and new clarification methods. On the second day, both groups will meet together to hear papers of mutual interest.

Special rates will be available at the Caribe Hilton and arrangements for accommodations can be made direct with the hotel or through Mr. Carlos Ubiñas, Puerto Rico Iron Works, Box 2381, San Juan, Puerto Rico.

■

South Porto Rico Sugar Company

Quarterly dividend of South Porto Rico Sugar Company was declared on August 26th payable to stockholders of record, September 15th. Dividend amounts to 25 cents per share, a reduction from the 50-cent per share payment made in previous quarters. It will be recalled that the company declared a 10% stock dividend last September 30th.

Board of Directors — Association of Cuban Sugar Technologists

President: Guillermo E. Ochoa; member since 1945; treasurer of the Association during 1953; third vice president and general coordinator of the working sections of ATAC during 1955; first vice president during 1957; author of numerous works published in the Annual Proceedings; technologist on industrial electricity; sales agent for industrial instruments; founder of the award bearing his name in the Engineering Section.

First Vice President: Senén Viego; member since 1937; president of the Manufacturing Section in 1945; assistant secretary in 1955; secretary and director of the "Boletín Oficial" in 1955; third vice president in 1957; author of numerous works published in the Annual Proceedings and of various technical works; master sugar chemist; superintendent of fabrication of Central Punta Alegre.

Second Vice President: Harry F. Pearson; member since 1953; engineer; chief engineer of Central Delicias.

Third Vice President: Angel Ramón Ruíz; member since 1937; received a Distinguished Service award in 1950; president of the Engineering Section in 1951 and of the By-Products Section in 1954; assistant treasurer in 1954 and treasurer in 1956; assistant director of the "Boletín Oficial" in 1952; author of numerous works published in the Annual Proceedings; electrical engineer; consulting engineer of Thomas F. Turull Company.

Secretary: Jorge C. Tarafa; member since 1944; mechanical engineer; assistant treasurer in 1951 and treasurer in 1955; assistant director of the "Boletín Oficial" in 1956; secretary in 1957; sales manager of the Powe Machinery Company.

Legal Secretary: Jorge Ramos Muñoz; consulting attorney for the Cuban Ministry of Labor and for various other national institutions. He also follows his legal profession privately.

Assistant Secretary: Tomás Fandiño López; member since 1944; vice president of the Manufacturing Section in 1955; president in 1956; director of the "Boletín Oficial" in 1957; author of numerous works published in the Annual Proceedings and the Official Bulletin; supervisor of fabrication of Central Violeta.

Treasurer: Issel L. Puig; member since 1947; technologist on industrial electricity; author of numerous works published in the Annual Proceedings and in the Official Bulletin; collaborator of H. Woodside on sales and service.

Assistant Treasurer: Joaquín Martínez Mestre; member since 1951; chemical engineer; technologist of the Marketing Department of the Cía. Petrolera Shell de Cuba; author of numerous works published in the Official Bulletin.

■

Cuban Sugar Technologists' Library

This library was founded in 1939 under the name of "Club Azucarero de Cuba" or Cuba Sugar Club with funds contributed by the Club, and is now located in the offices of the Asociación de Técnicos Azucareros de Cuba at Calle 19 #9, Vedado, Havana, Cuba.

Its object is to collect as much sugar literature as possible, both national and foreign. At present it contains some 2,500 volumes, including books, magazines and pamphlets, obtained by purchase, exchange and donation.

The Library receives over 700 issues of magazines or trade journals and over 100 books and pamphlets per year. Exchange arrangements have been made with nearly all similar institutions in the world. Among its possessions we find the 3rd (1878), 4th and 5th editions of Álvaro Reynoso's "Ensayo Sobre el Cultivo de la Caña de Azúcar" or Essay on Sugarcane Culture. (An interesting point about the 3rd edition is that it bears the autograph of the author.) The Library includes works by such authors as Pieter Honig, L. A. Tromp, Arthur Rosenfeld, Harold E. Box, Alfred L. Webre, Noel Deerr, Rafael Pedrosa, Senén Viego, Prinsen Geerlings, Spencer & Meade, and others. Among the trade journals we find a complete collection of "Sugar" since 1927; a complete collection of the "International Sugar Journal" since 1927; "El Mundo Azucarero"; "Socker" (Sweden); Proceedings of Sugar Technologists from Queensland, Australia, India, South Africa, United States, Perú, the Philippines, etc. It also includes the majority of official and private publications published in Cuba pertaining to the sugar industry; "Brasil Acucareiro" and other publications of the Instituto do Acucar e do Alcool of Brazil; a complete collection of the Congresses held by the International Society of Sugar Cane Technologists; the Hawaiian Sugar Planters' Records from 1909 to 1935, and other important publications of the Hawaiian Sugar Planters' Association; Sugar Industry Abstracts (an extremely important publication of monthly résumés of everything published about sugar in its various aspects in the world press, which is especially useful to keep up-to-date); Cuba, Puerto Rico, Hawaii, and other countries' Sugar Manuals; Sugar Catalogs, etc.

The Library maintains numerous contacts by correspondence in Cuba and abroad in its continuous effort to obtain information. It also receives many telephone and personal calls, and its services are absolutely free and are available to the general public. Its present director is Ing. Segundo Pérez Alonso.

A corner of the extensive library in the headquarters of the Asociación de Técnicos Azucareros de Cuba. Here, reading from left to right: Guillermo Ochoa, Senen Viego, Issel L. Puig and Jose Ramon de la Vega of the Association study some recent acquisitions.

Status of Cane Agriculture in Cuba

By L. C. Scaramuzza, F.R.E.S.,
Entomologist, Cia. Azucarera Atlántica del Golfo

ADVANCES in sugar cane agriculture in Cuba are profoundly affected by the condition of the world market and the size and limitations placed on the Cuban crop. These complex considerations make it necessary to review briefly certain fundamental aspects of cane agriculture in this country.

Sugar cane is planted as cuttings of cane each containing several eyes or buds which, upon germination, develop into the mature stalk. These new plantings should not be harvested for commercial production of sugar until at least 16 months after planting; frequently, best results are obtained by harvesting at 20 to 24 months. One planting will yield successive crops for from five to 15 years from ratoons. Often a single planting will yield 20 or more crops. Ratoon crops are cut when they are 11 or 12 months old. Since the original planting is on a staggered basis, some new planting is required each year to maintain the productivity of the colonia. As the world's principal sugar producing country, Cuban economy is based largely on the return from the sale of the sugar crop and it is important to take steps to maintain world prices at an equitable level. Hence, the Cuban Government regulates sugar production each year through the Instituto Cubano de Estabilización del Azucar (Cuban Institute for Sugar Stabilization) a consulting body formed by representatives of the Sugar Mill Owners Association and the Sugar Cane Planters Association. The agency determines in advance the amount of sugar that each mill will be permitted to produce and the mill, in turn, determines the amount of cane required to produce this allotment of sugar. The Institute supervises the enforcement of its regulations carefully with the consent of the mill owners and growers to insure strict adherence to its quotas for each mill.

L. C. Scaramuzza

During the last decade striking advances have been made in mechanization of the entire agricultural cycle of sugar cane culture. The romantic bulls pulling agricultural appliances have become a thing of the past. Today, bulldozers, tractors, land-levelers, planting and cultivating machinery are used in the scientific and efficient preparation of the land devoted to cane growing.

Much progress has also been made in transportation of the mature cane crop from field to mill. The classic ox-cart has given way to rubber-tired cane carts drawn in train by tractors, by the use of modern trucks operating on paved roads and highways rapidly moving cane direct from the field to the mill.

Technical advances are also noted in the increased use of chemical fertilizer and the continuous enlargement of the cane area under irrigation with a corresponding improvement in the quality of the pumping equipment in use. Although Cuba is endowed with an ideal climate for sugar cane culture and generally has abundant rain-

Liberating Lixophaga *flies in a cane field, for the biological control of the sugarcane borer, in Matanzas province, Cuba.*

Interior view of a laboratory for the production of the Lixophaga *fly, in the province of Matanzas, Cuba.*

fall, the rains do not always fall at the period in the growing cycle when they are most needed. Those areas without irrigation are consequently dependent on the whims of nature. Despite the very high productivity of the soil and an adequate total annual rainfall, unless the distribution of the rains corresponds closely with the growth cycle, results are not as satisfactory as in the case where irrigation facilities are provided.

But even where irrigation systems are provided on lands of high productivity, as is generally the case, the extent of the use of irrigation and of chemical fertilizers still depends on the outlook for the coming crop. If a sharp restriction on the amount of sugar to be produced has been established by the government, as was the case this year, cane may be carried over into the following year with consequent reduction in new plantings, in the use of chemical fertilizers and in the use of irrigation which is resorted to only in case of extreme need.

In respect to varieties, there has been somewhat less change in the last decade than in other aspects of sugar cane culture. POJ 2878 is still the variety most extensively cultivated in Cuba. Some other varieties are also commercially planted but to a much lesser extent. These comprise POJ 2714, POJ 2727, POJ 2883, POJ 2961, POJ 3016, Pepe Cuca and M.L. 3-18. In addition, Co. 281 and Co. 290 is planted in some of the poorer lands. Because of their high degree of susceptibility to Mosaic disease, Barbados canes such as B. 34104 and B. 37161 have been used with extreme caution. This situation has, no doubt, been influential in preventing the planting of more of these varieties despite the fact that there are now several Mosaic-resistant varieties giving good yields in many places.

Excellent work is being done at the Ministry of Agriculture's Sugarcane Experiment Station in producing several new varieties such as Cuba 693-47, Cuba 529-50 and others which have produced better yields than the standard POJ 2878 in several commercial tests at different plantations where direct comparisons have been made. Mill owners and cane planters, however, are taking an extremely conservative view of the new varieties and it appears that several more years of experimentation will be necessary before there is widespread acceptance of these varieties, an attitude that is fully justified considering that varieties now in use produce ratoons that yield profitable crops for 15 to 20 years. It is not yet known if an equal performance can be expected from the newer varieties.

Cuba is indeed fortunate in being free of the principal diseases of economic importance. An exception is Mosaic disease but this is commercially unimportant since no susceptible varieties are planted. The Ratoon Stunting disease has been reported in several areas lately but very little data is available as yet. Cuba is free of all other commercially important diseases such as Chlorotic Streak, Gummosis, Leaf Scald, Cane Smut and others that are common to several cane producing countries some of which are located close to Cuba.

As to insects, we are again fortunate since very few of economic importance affect our crop. A marked exception is the sugar cane borer, *Diatraea saccharalis* F., a small moth whose caterpillars bore into the stalks of the cane. There are 16 species of *Diatraea* in the Americas and some countries have as many as six different species of these voracious cane destroyers; but in Cuba, we have only the species mentioned above. *D. saccharalis* has the greatest geographical distribution being found from the United States to Argentina. It is the species responsible for the greatest amount of damage to sugar cane crops which has been estimated at $60 million annually. To appreciate the extent of this damage it should be pointed out that entomologists in the United States estimated that the loss from borers in Louisiana alone in 1952 was $9,000,000 and was expected to run still higher in 1953 despite the use of chemical insecticides. In Cuba, the yearly loss has been estimated at $10 million to $12 millon but, of course, the Cuban crop at 5,500,000 tons is 11 times greater than the Louisiana crop at approximately 500,000 tons.

The Cuban Fly, Lixophaga; *its pupa and the maggot issued from a borer.*

Larva of the sugarcane borer, Diatraea saccharalis; *chrysalis and moth.*

The damage of the borer is caused by the caterpillars or larvae which bore into the joints or internodes of the sugar cane, making tunnels while feeding until they develop into moths. Fungi, bacteria and yeast gain entrance to the stalks through these tunnels and produce fermentations which decompose the juices thus reducing the amount of recoverable sugar which is the major cause of loss.

It has been possible to ascertain that an infestation of 15 to 20% of the joints, causes a loss of 1.0% of the recoverable sugar which will represent a loss of many thousands of dollars to any sugar mill.

The borer causes still other losses such as a decrease in the weight of the damaged cane and the death of many stalks. Some are killed when perforated through the base while still young, others die at all ages due to the numerous tunnels made by the borer. In the benign climate of Cuba the borer can complete its development in about one month so that 12 generations may be counted in one year. Lower temperatures affect its development so much that in Louisiana, for example, only four or five generations occur per year.

Notwithstanding the great difference in the number of generations in the two regions, the extent of the damage from the identical insect is almost the same in both areas despite the fact that the crop is 11 times larger in Cuba. The reason for this peculiar situation is of great interest and may be explained as follows.

All insect pests attacking crops of the world have natural enemies or parasites consisting of other insects which have adapted themselves to live from the crop pest. Thus an equilibrium is established without which crop pests would multiply to an extent that would result in destruction of all food crops. This equilibrium is known as biological control and is far more effective in the cane fields of Cuba than in Louisiana.

In Cuba the borer has a long list of natural enemies that comprises more than 10 species ranging from minute wasps that destroy the eggs laid by the moths up to lizards that feed on the caterpillars and moths. The most important of these

enemies, however, is a small fly, known in entomological literature as the "Cuban fly" carrying the scientific name of *Lixophaga diatraeae* Tns., whose parasitism is greater than all other species of the borers' enemies combined.

Due to the presence of these natural enemies of the sugar cane borer in Cuba, the use of insecticides is not recommended. Where insecticides have been tried, the results showed that the parasites were diminished and the borer damage increased. In many regions of Cuba where the parasites and especially the "Cuban fly" find favorable conditions, the borer causes little damage. Under conditions unfavorable to the parasites, such as long periods of drought or where cane fields are burned, it is necessary to help nature by the artificial rearing of borer parasites. Producing the Cuban fly by methods published by the author more than 25 years ago and liberating them in the cane fields reduces the infestation by more than half. The cost is only a few thousand dollars and is, in fact, so low that it scarcely reaches 1.0% of the loss that would be caused by the borer.

But let us see how this fly works. *Lixophaga* develops only in the worms of the sugar cane borer so it must actively seek them out in order to subsist. Its only host is *D. saccharalis* and it cannot survive in any other species. The adult fly feeds on the sweet juice of the cane that surrounds fresh borer holes, and as it always feeds before laying its maggots, these are always adjacent to live borers. The adult fly produces living maggots instead of eggs and, as soon as laid, the maggots enter the hole to look for the borer, penetrate into it and feed on it until they kill the borer in five to six days; thereafter they emerge to form a pupa. After about 10 days an adult fly will emerge from the pupa and mate; a few days later the fly will produce maggots as the beginning of another cycle. As each fly has over 200 embryos and its complete life cycle takes less than a month, a few generations will produce astronomic numbers of these useful flies in the fields; it is for this reason that they are so efficient.

In rearing the flies in the laboratory, they are kept in wire frames of cylindrical shape, covered with white cotton cloth. From 25 to 50 pairs of flies are placed in each container. A small number of flies are kept in the laboratory to be used for artificial multiplication by dissecting the gravid females under a microscope. The maggots thus obtained are placed on borer caterpillars with a fine brush and after eight days more pupae emerge to continue the laboratory breeding. The efficiency of this inoculation is generally over 90% and one entomologist with two assistants can easily produce over 10,000 flies per month during the spring and summer. The flies are liberated in the infested fields at the rate of 50 to 150 pair per caballeria (33 acres).

Although the fly is a native of the Greater Antilles only, it has been introduced into several countries with excellent results when the ecological conditions were suitable for its establishment; the insects are very sensitive to climatic conditions. Attempts have been made in Cuba to introduce other borer parasites from South America, such as *Paratheresia claripalpis* V. d.W. from Trinidad and Peru and *Metagonistylum minense* Tns. from the Amazonian region but without success. Apparently they did not find conditions in Cuba suitable.

Despite the success that has been achieved in Cuba with biological control of cane borers, the use of this simple and inexpensive method is not as widespread in the country as it should be. Although liberation of *Lixophaga* increases from year to year, it is reasonable to estimate that not more than 20% of the mills on the Island are presently making use of this form of control. In 1957 perhaps 12 mills—the work is usually done at the mill—and the Sugar Cane Experiment Station reared and released 265,035 flies, distributed as follows:

Mills	Number of Flies Liberated
Cia. Atlantica del Golfo: Aleva, Conchita, Mercedes, Lugareño, Rosario	86,686
Francisco & Elia	54,691
Toledo	32,000
Cuba	31,000
Adelaida	21,300
Sugar Cane Experiment Station	15,000
Triunfo	12,358
España	12,000
TOTAL	265,035

This list is by no means complete as it is known that other plantations release *Lixophaga* but have not supplied complete data. It is hoped that more general release of these useful flies will become the rule in the future in order to maintain the rate of sugar production in Cuba and to avoid the loss of sugar worth millions of dollars as the result of the depredations of a small worm.

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Major Sugar Development In Iran

A 10,000 acre sugar cane plantation, a mill with a daily capacity of 3,000 tons and a refinery capable of producing 30,000 tons of refined sugar per year is being established in Iran as a first step in Iran's program of self-sufficiency in sugar. First stage production will represent about eight percent of the country's annual consumption. At present, about 65% of the domestic requirements are imported and the balance obtained from sugar beets grown in the northern provinces. The current cane project will be located near the ancient city of Shush, 130 miles north of the Persian Gulf in the Khuzestan region. The project, which is estimated to cost $23 million, will be engineered and supervised by Development and Resources Corporation headed by David E. Lilienthal and Gordon R. Clapp, both former chairmen of the Tennessee Valley Authority, who have undertaken the project on behalf of the Iranian Government's Plan Organization. Development and Resources recently retained the Ralph M. Parsons Company of Los Angeles who will be responsible for developing the project and managing its initial operations. The Parsons firm, engineers with extensive overseas experience in water resources development and in the construction of petroleum installations, will be assisted by the Hawaiian Sugar Company, a wholly-owned subsidiary of C. Brewer & Company of Honolulu. Plans call for the training of Iranians in all phases of the work of the plantation, mill and refinery so that the entire plant can be operated by an Iranian organization at an early date. Installation of a complete irrigation system, plantation roads and housing will be necessary in addition to the construction of the mill and refinery.

■

Pott, Cassels & Williamson Company Sold

The Mirrlees Watson Company of Glasgow announces the purchase of the firm of Pott, Cassels & Williamson. Both companies are important suppliers of sugar mill equipment and have installations in sugar producing areas throughout the world. Pott, Cassels & Williamson will continue business under this name.

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Cleaning Liquid Sugar Tanks

A jet unit for cleaning the interior of tanks, tank cars or tank trucks that is finding an application in the liquid sugar industry, is described by Sellers Injector Corporation. Known as Rotor Jet, it can be lowered into the tank suspended only by its hose with no additional support. The head of the unit is rotated by compressed air and directs two solid, high impact, hot or cold liquid jets in a full spherical path scrubbing the entire inner surface of any shape tank. Rotation speed can be varied, bacteria reagents can be added; it is not necessary for personnel to enter the tank,

Modern Concept of Mill Control

New System Being Adopted in Cuba

By Ing. Ubaldo Villar

Up to the 1950 crop inclusive, Central "A" and other factories belonging to the same company, were using what is herein called the "old system of mill control" which is based on two fundamental postulates:

A. Dilution %of normal juice equals imbibition % cane;

B. Purity dilute juice = purity normal juice.

By "normal juice" is here meant "juice as it exists in the cane minus an undetermined amount of water retained in the fiber." At the last meeting of the International Society of Sugar Cane Technologists it was decided to discard this outmoded concept of "normal juice" and to substitute for it the concept of "absolute juice" which is defined as "the cane minus the fiber" and which is now recognized as the basis for a "modern system of mill control." This change from "old" to "modern" has required a substantial change in the method of calculating "extraction of absolute juice" which is a sufficiently rational measure of "milling efficiency."

However, the majority of Cuban sugar factories are still following the old system which must eventually, if gradually, give way to the more realistic and flexible modern system. To help in accomplishing this change the author here presents a succinct and easily comprehensible account of the modern system.

In this system, to arrive at a knowledge of "extraction of absolute juice" a previous calculation of "water of dilution" is unnecessary because it is obtained through knowing the difference between quantity of absolute juice extracted and mixed juice. This calculation may be made in two different ways, depending on the available data:

1. Weights of cane, water of imbibition and bagasse (the latter obtained by a previous calculation of bagasse % cane for which a direct determination of fiber in cane is necessary) being known, the weight of mixed juice can be calculated.

2. Knowing the weights of cane, water of imbibition and mixed juice, the weight of bagasse can be calculated.

Case I. *When weights of cane, imbibition water, and bagasse are known:*

The weight of bagasse is obtained by a direct determination of fiber in cane in which a sample of the cane is completely disintegrated by a suitable defibrating apparatus with alternate washings and pressings of the residue. Then, since fiber in cane is identical with fiber in bagasse, we have the relations: weight of bagasse divided by weight of cane equals fiber % of cane divided by fiber % of bagasse; and bagasse % cane equals fiber % cane divided by fiber % bagasse times 100.

Once bagasse % cane is known and has been multiplied by weight of cane, we have obtained the weight of bagasse and are in a position to calculate the arrobas* of mixed juice, so:

Mixed juice = cane + imbibition water − bagasse.

The "fiber % of bagasse" which appears in the formulas containing "bagasse % cane" has to be previously calculated indirectly from "last juice extracted: and "pol of bagasse"; these are averaged data taken from the daily analysis report. For determining the value of this fiber it has to be assumed that "the juice retained in the bagasse" has the same purity and pol values as the juice extracted between the upper and the bagasse rolls of the last mill of the tandem; from these values are calculated brix or % of soluble solids in mixed juice. Then fiber % bagasse equals 100 minus moisture % bagasse minus brix of bagasse.

We now know weights of cane, imbibition, water, bagasse, mixed juice, and the analysis of the other juices; having determined fiber of bagasse, we are in a position to approach calculations which lead to the values of the various extractions and to other functions that enter into the complete frame of the modern system of mill control. Below we give a broad outline of the various steps to be followed.

Having found the arrobas of soluble solids, pol of bagasse and of mixed juice, and the sums of the solids and the pols of these entities, we will know the sum of the soluble solids and pol of the cane, respectively. Arrobas of fiber in cane are the same as in the bagasse, and if we subtract this value from the weight of cane we will have arrobas of absolute juice. Dividing arrobas of soluble solids in cane into arrobas of absolute juice, we have the brix of that juice and the purity of the absolute juice will be obtained by dividing pol of cane into arrobas of soluble solids in cane. Pol of absolute juice extracted is found by multiplying its purity by the corresponding brix.

Now it is easy to find arrobas of absolute juice extracted by dividing arrobas of soluble solids of mixed juice into brix of absolute juice extracted; knowing arrobas of absolute juice and dividing it into weight of cane and multiplying by 100, we arrive at absolute juice extracted. Arrobas of water of dilution are obtained by subtracting arrobas of absolute juice extracted from arrobas of mixed juice.

Extraction of pol is obtained by dividing arrobas of pol in mixed juice into arrobas of pol in cane. To complete the data for mill control it remains only to compute the various percentages which it would be superfluous to recount here.

Case II. *When weights of cane, water, of imbibition and mixed juice are known.* The first step in this method is to calculate weight of bagasse using the fundamental equation:

@ bagasse + @ imbibition water − @ mixed juice

The procedure to be followed for calculating the remaining elements of the system of mill control is the same as given in Case I and need not be repeated.

In continuation, we now present an example of how the modern system of mill control has been developed at Central "A."

Case I. *When weights of cane, water of imbibition and bagasse are known.* The basic data are arrobas of cane ground (560,112) and arrobas of water of imbibition (101,325).

* An arroba is 25 lbs. and in this discussion is represented by the symbol @.

Table I. Average analyses of cane and juices of bagasse of a given day.

	Brix	*Sucrose*	*Apparent Purity*
Mixed juice	**16.14**	**13.65**	**84.57**
Last juice extracted	**4.33**	**3.45**	**79.68**
Pol % bagasse	**3.38**		
Moisture % bagasse	**48.80**		
Fiber % cane	**12.28**		

The preliminary calculations include these steps:

Brix of bagasse $(3.38 \times 100)/79.68 = 4.24$

Fiber % bagasse $= 100 - (48.80 + 4.24) = 100 - 53.04 = 46.96$

Bagasse % cane (fiber % cane/fiber % bagasse) $\times 100 = (12.28/46.96) \times 100 = 26.15$

With these data we proceed with the definitive calculations concerned in the modern system of mill control.

A. *Calculation of arrobas of bagasse:*

@ bagasse $= 560{,}112 \times 26.15/100 = 146{,}469$

B. *Calculation of arrobas of pol, solids, fiber and water in bagasse:*

@ pol $= 146{,}469 \times 3.38/100 = 4{,}951$

@ soluble solids $= 146{,}469 \times 4.24/100 = 6{,}210$

@ fiber $= 146{,}469 \times 46.96/100 = 68{,}782$

@ moisture in bagasse $= 146{,}469 \times 48.80/100 = 71{,}477$

C. *Calculation of arrobas of mixed juice pol, and soluble solids in mixed juice:*

@ of mixed juice = @ cane + imbibition water − @ bagasse

@ mixed juice $= 560{,}112 + 101{,}325 - 146{,}469 = 514{,}968$

@ pol $= 514{,}968 \times 13.65/100 = 70{,}293$

@ soluble solids $= 514{,}968 \times 16.14/100 = 83{,}116$

D. *Calculating arrobas fiber, pol and soluble solids in cane:*

@ fiber % cane $= 560{,}112 \times 12.28/100 = 68{,}782$

@ pol cane = @ pol mixed juice + @ pol bagasse

@ pol cane $= 70{,}293 + 4{,}951 = 75{,}244$

@ soluble solids in cane = @ soluble solids in mixed juice + @ soluble solids in bagasse

@ soluble solids in cane $= 83{,}116 + 6{,}210 = 89{,}326$

E. *Calculation of arrobas of absolute juice:*

@ absolute juice = @ cane − @ fiber

@ absolute juice $= 560{,}112 - 68{,}782 = 491.330$

F. *Calculation of brix, pol and apparent purity of the absolute juice:*

Brix absolute juice = (@ soluble solids in cane/absolute juice) $\times 100$

Brix absolute juice $= (89{,}326/491{,}330) \times 100 = 18.18$

Purity absolute juice = (@ pol in cane/@ soluble solids in cane) $\times 100$

Purity absolute juice $= (75{,}244/89{,}326) \times 100 = 84.24$

Pol absolute juice $= 18.18 \times 84.24/100 = 15.31$

G. *Calculation of arrobas of absolute juice extracted:*

@ absolute juice extracted = (@ solids in mixed juice/brix absolute juice) $\times 100$

@ absolute juice extracted $= (83{,}116/18.18) \times 100 = 457{,}184$

H. *Extraction absolute juice or absolute juice extracted % cane:*

Extraction absolute juice $= (457{,}184/560{,}112) \times 100 = 81.62$

I. *Extraction of pol or pol extracted % cane:*

Extraction of pol (@ pol in mixed juice/@ pol in cane) $\times 100$

Extraction of pol $= (70{,}293/75{,}244) \times 100 = 93.42$

J. *Extraction of mixed juice or mixed juice extracted % cane:*

Extraction of mixed juice = (@ mixed juice/@ cane) $\times 100$

Extraction of mixed juice $= (514{,}968/560{,}112) \times 100 = 91.94$

K. *Calculation of arrobas of water of dilution:*

@ of water of dilution = mixed juice − absolute juice extracted

@ of water of dilution $= 514{,}968 - 457{,}184 = 57{,}784$

L. *Calculation of the remaining percentages for completion of the mill control sheet:*

Dilution % absolute juice extracted = (@ water of dilution/@ absolute juice extracted) $\times 100$

Dilution % of absolute juice extracted $= (57{,}784/457{,}184) \times 100 = 12.64$

Dilution % of mixed juice = (@ water of dilution/@ mixed juice) $\times 100$

Dilution % of mixed juice $= (57{,}784/514{,}968) \times 100 = 11.22$

Pol % cane = (@ pol cane/@ cane) $\times 100$

Pol % cane = (@ pol cane/@ cane) $\times 100$

Pol % cane $= (75{,}244/560{,}112) \times 100 = 13.43$

Imbibition % cane = (@ imbibition water/@ cane) $\times 100$

Imbibition % cane $= (101{,}325/560{,}112) \times 100 = 18.09$

Dilution % cane = (@ water of dilution/@ cane) $\times 100$

Dilution % cane $= (57{,}784/560{,}112) \times 100 = 10.32$

And finally, as a check, it remains to verify the equation:

Extraction mixed juice = dilution % cane + extraction of absolute juice:

$91.94 = 10.32 + 81.62 = 91.94$

With these percentages the mill control sheet will be complete. We may now proceed to Case II where we will consider those points which differ substantially from Case I. These variants are few, and otherwise the procedure is the same.

Case II. *When weights of cane, water of imbibition and mixed juice are known.*

This case differs from the first case only in that it is not bagasse which is determined directly, but is the mixed juice; this factor is determined every day either by direct weighing or other method of measurement (by volume of flow through a Venturi, for example). With the weight of mixed juice known, the weight of bagasse is calculated from the fundamental equation:

@ bagasse = @ cane + @ water of dilution = mixed juice

The procedure to be followed in the calculation of mill control in Case II is otherwise the same as for Case I. The author of this article is inclined to prefer the procedure according to Case II if the weight of mixed juice has been obtained by direct weighing or other appropriate means in which confidence can be placed, and then inserting this value in the fundamental equation; personal experience is that this procedure relieves the uncertainty associated with a direct determination of fiber % cane. Such determinations have to be made during every shift on truly representative samples of cane and the three results averaged to obtain a figure for the day. There are many factors affecting determination of fiber % cane; the methods of analysis are tedious and subject to appreciable variations depending on fluctuations of working conditions and reliability of the personnel. The same applies to determination of fiber % bagasse, wherein the calculations are also affected by many variables.

From the foregoing it may be concluded that the value obtained for bagasse % cane does not afford any great guarantee and consequently when weight of mixed juice is calculated from the fundamental equation there is a chance that the results may depart significantly from the truth.

There is still a third case for a modern system of mill control in which the direct data would be weight of cane, weight of mixed juice and weight of bagasse. While in this case and in Case I the weight of bagasse is assumed to be a direct datum, it is to be understood that its calculation starts from the quotient fiber % cane/fiber % bagasse, expressed as a percent and from which weight of water of imbibition is calculated by the fundamental equation. In this Case III, the subsequent calculations are identical with those of Case I.

We now follow with a comparison between the old and the modern systems, using the values obtained according to Case I. In order to show the marked discrepancies between these values they are assembled in Table II, which includes the names and expressions appropriate to each system, under the headings: Old System—Modern System.

The four primary entities—those involved in the fundamental equation—are practically invariable. There is a small difference in the arrobas of diluted juice and bagasse found by the one or the other method, but these differences are due to the customary habit of dropping or including the third decimal according to

whether it is larger or smaller than five. This occurs when bagasse is computed in the modern system when bagasse % cane is determined by the standard formula. This small difference is here ignored; the most important of the others are hereunder treated successively in separate paragraphs.

A. The first notable difference occurring in Table II is the matter of water of dilution. By the old system this would amount to 78,880 arrobas against 57,784 by the new system. This large difference is clearly due to the arbitrary assumption that dilution % normal juice is equal to imbibition % cane and when this is taken as the base for deriving the formula for calculating the water of dilution, the result will be far too great and by that much will diminish the value for normal juice.

As a consequence of this pronounced difference between the quantities of water of dilution calculated by the two systems, the same relation will appear in all percentages involving water of dilution. This may easily be seen by comparing the values appearing in Table II for dilution % normal juice, dilution % diluted juice, and dilution % cane calculated by the old system as compared with the modern system.

B. In consequence of the differences between weight of water of dilution calculated by one or the other method, there also arises a difference between the values of the juice extractions.

As noted above, the old system gives a higher value for water of dilution than does the modern system; and for that reason, when this water is subtracted from diluted juice to obtain the normal juice, the result is a value inferior to that obtained by the system based on the absolute juice. From this, it results that extraction of normal juice is always much below the extraction of absolute juice; see Table II where the respective figures are 77.85 against 81.62.

C. In Table II there also appears a difference between the degrees of brix and purity of the normal juice and the absolute juice. Because in the old system the quantity of normal juice is less than that of absolute juice extracted according to the new system, it results that the brix of this juice is the greater (because the arrobas of solids in diluted juice must be divided into a smaller quantity), that is, 19.06 against 18.18 brix.

Finally, we have only to compare the magnitudes of normal juice and absolute juice according to the one or the other systems. In the old system it is supposed that the purity of the normal juice is equal to that of the diluted juice and that, on this basis, in conjunction with the value of the brix (previously obtained), it is possible to calculate the percentage of sucrose in that juice.

But in the new system of mill control we arrive at a conclusion that this assertion is fallacious, and that there exists a difference between the purity of the absolute juice and that of the mixed juice, the latter being the *lesser* because the purity of the juice retained in the bagasse is always lower than that of the final juice. This means, in effect, that for the purities of these two juices to coincide it would be necessary to arrive at the ideal case where the bagasse is barren of soluble solids and therefore of sucrose—or, in other words, free from juice which is practically impossible.

The sign of good work of the tandem is a close agreement of the two purities. The smaller the difference between the purity of the mixed juice and the purity of the absolute juice, the more efficient is the operation of the mills and the greater their recovery of sugar.

Table II. Comparison of the old and the new systems of mill control

Old System		*Modern System*	
@ cane milled	560,112	@ cane milled	560,112
@ water of imbibition	101,325	@ water of imbibition	101,325
@ diluted juice	514,920	@ mixed juice	514,968
@ bagasse	146,517	@ bagasse	146,469
@ water of dilution	78,880	@ water of dilution	57,784
@ normal juice	436,040	@ absolute juice extracted	457,184
extraction of normal juice	77.85	extraction of absolute juice	81.62
extraction of sucrose	93.42	extraction of pol	93.42
extraction of diluted juice	91.93	extraction of mixed juice	91.94
dilution % normal juice	18.09	dilution % absolute juice extr.	12.64
Dilution % diluted juice	15.32	dilution % mixed juice	11.22
fiber % cane	12.28	fiber % cane	12.28
sucrose % cane	13.43	pol % cane	13.43
imbibition % cane	18.09	imbibition % cane	18.09
dilution % cane	14.08	dilution of % cane	10.32
brix normal juice	19.06	brix absolute juice	18.18
purity normal juice	84.57	purity absolute juice	84.24

■

Dr. Gustave T. Reich

Dr. Gustave T. Reich, widely known consulting chemical engineer of Philadelphia, died suddenly on August 18, 1958. He was born in Austria, educated in Budapest, Zurich, the Sorbonne in Paris and finally at the University of Berlin where he obtained his doctor's degree at age 24. A year or so later he undertook a tour to New York and, as Providence would have it, he found a job with the Lackawana Steel Company. A bench job at that time paid $50.00 per month and required seven 12-hour days of work per week. When an opportunity came he switched to the Hooker Chemical Company in Niagara, and just before World War I, accepted a job in Gooderham and Worts distillery in Hamilton, Ontario, which offered activity in his chosen line.

Ultimately he returned to the United States, and in 1921 joined the Mason By-Products Company near San Francisco. The prime product of this plant was alcohol produced from molasses. While the price warranted, the stillage (slop) was evaporated for the recovery of potash. The CO_2 from the fermenters was liquified without purification, and here Dr. Reich began the development of his purification process.

Now it happened that the new distillery which had been built by the idle Anaheim, California beet sugar estate, was attempting to remove impurities from the CO_2 by means of the costly absorption process used in coke plants. The CO_2 exudes from the molasses fermenting mash at a purity of about 99.8. Within this 0.2% of extraneous matter there lurks an obnoxious aroma which the absorption process did not remove. At this stage Dr. Reich was invited to reconstruct and operate the works. At the very start he ran into difficulties and was dubbed "Dr. Somehow" because he always declared optimistically that "somehow" a solution would be found for every problem. Parenthetically, this appellation was later abbreviated to "Doc" to accord with his friendly character.

About 1925 the Pennsylvania Sugar Company was seeking a consultant to design the installation of CO_2 liquifying equipment into its by-product distillery. This led to an invitation to Dr. Reich and resulted in a contract. When the construction was complete, Doc came from California with his overalls and placed the plant on stream. Manager Bill Hoodless did not let him escape but forthwith appointed him director of research and chemical control of the sugar refinery and by-products plant.

At the conclusion of the war in 1945, the Pennsylvania Sugar Company decided to sell its by-product subsidiaries and accordingly Doc set up a consulting practice. He immediately attracted commissions for installations of CO_2 and yeast plants. His plants were built in Cuba, Puerto Rico, Virgin Islands, Costa Rica and, at the time of his death, propositions were active in Mexico and South America.

Doc was an indefatigable researcher, impossible to discourage. Furthermore he was a humorist and a scientist of superior ability—and according to certain famous philosophers, humor and intelligence are complimentary characteristics. And withal Doc was a fine and lovable gentleman.

DAN GUTLEBEN

Personal press station

Edward B. Holroyde, manager of Kahuku Sugar Company on the Island of Oahu, Hawaii, has been named to succeed John Sandison as manager of McBryde Sugar Company on the Island of Kauai. Mr. Sandison retires in March, 1959. Mr. Holroyde is shown beside one of the Kahuku Hilo trailers which he put into use when converting from rail to road transport of cane five years ago.

Dan C. Melarkey has been named acting manager of Hilo Sugar Company on the Island of Hawaii. He replaces **Lawrence S. McLane** who is now in Iran with the new $23 million sugar development project in which C. Brewer & Company is participating. Mr. Melarkey has been field superintendent of Hilo since 1956.

William G. Rabe, co-chairman of the 53rd annual appeal of the Travelers Aid Society of New York has announced the appointment of **Horace Havemeyer, Jr.,** as chairman of the Sugar Division. Mr. Havemeyer is president of The National Sugar Refining Company. Travelers Aid is a private, non-sectarian agency which receives its support entirely from voluntary contributions. It gives immediate, confidential help, free of charge, to anyone in trouble away from home.

Lawrence S. McLane

A nine-man Puerto Rican Government mission recently inspected the Hawaiian sugar, pineapple and coffee industries. They were, front row, l. to r.: Juan Fuentes-LeDuc, House Labor Committee member; Juan Davila-Diaz, Senate Agricultural Committee chairman; Luis Rivera-Santos, Secretary of Agriculture; Nestor Rigual, secretary of the House of Representatives. Rear row, l. to r.: Dr. Bernardo-Capo, associate director of the Agricultural Experiment Station; David Rodriguez, executive director of the Land Authority; Ernesto Carisguillo, Senate Labor Committee chairman; Luciano Fuertes, Department of Agriculture member; Mario Canales, chairman of the Agricultural Committee of the House of Representatives.

Irvan Wolff, manager of S. A. Leao Irmaos, Maceio, Brazil, arrives in Hawaii with Mrs. Wolff completing his sixth round trip to the Islands via United Air Lines. Following a short stay in Hawaii, Mr. Wolff returned to Brazil at the end of August to prepare for the new crop.

Area of Potential Progress

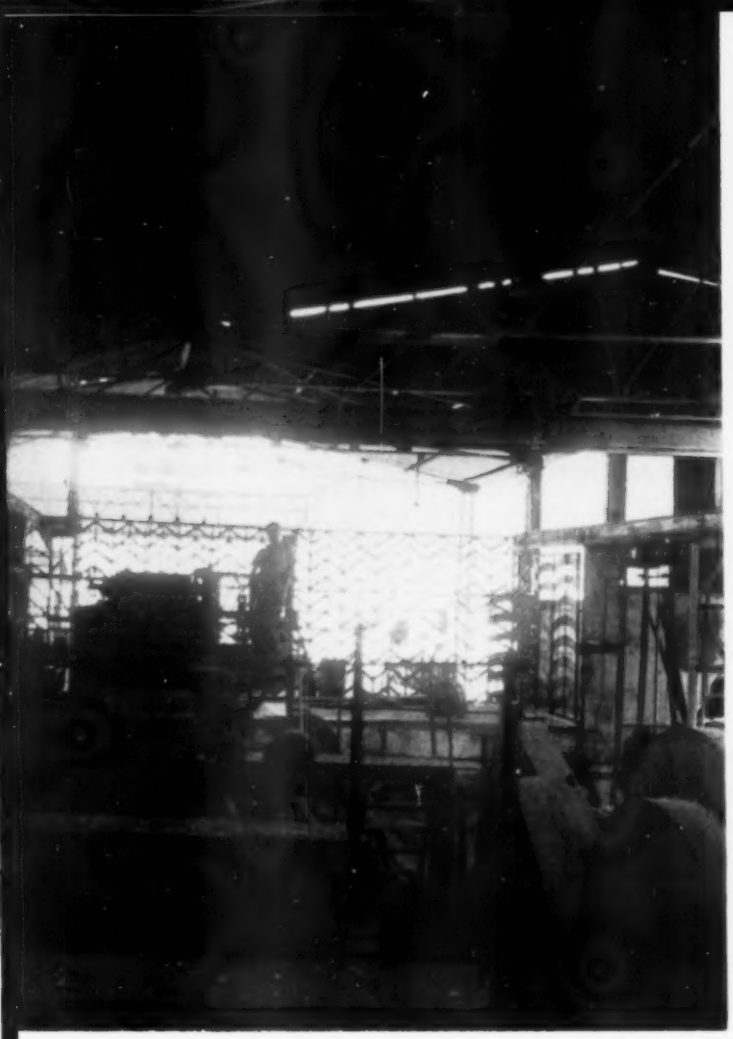
UNLIKE most sugar countries, agricultural production and efficiency in Costa Rica are surpassing factory performance. Emphasis on new varieties, irrigation, fertilization and chemical weed control is paying dividends in field production which is taxing the capacity of the Republic's 26 small factories, currently located in the highlands at altitudes of 2,700 to 4,500 feet. At upper left may be seen an example of this agricultural progress in a fine stand of cane at Hacienda "Ojo del Auga". The lower left hand illustration shows overhead irrigation doubling the yields of Hacienda "La Luisa." The traditional ox-cart, pictured below, is giving way to tractor drawn trailers.

The lowlands of both the Atlantic and Pacific Coasts are now opening to new sugar and rice production. Extensive plantations are in development as a more efficient supplement to the sugar-and-coffee economy of the central highlands. A token export quota of 2,000 tons annually to the United States bolsters an otherwise domestic market for 35,000 tons of centrifugal whites and approximately 40,000 tons per year of open-pan loaf sugar. At lower right may be seen a typical open-pan operation in Costa Rica.

Costa Rica is an open prospective market for modern factory equipment. Most mills

SUGAR IN COSTA RICA

Text & Photographs By Harold A. Shaw



and pan floors are 20 to 30 years old with a conglomeration of German-, British-, American- and shop-made evaporators, vacuum pans and mill rollers. A typical mill may be seen at top center where "La Victoria", the only cooperative sugar factory is pictured. Only one factory has a laboratory for chemical control and none maintains a sugar balance to measure losses. New equipment is being added to eliminate production bottlenecks as may be seen in the picture of the "Cataluna" factory at upper right where equipment modernization has begun.

Sugar grain and color are surprisingly uniform. The *Junta de Caña*, composed of two members each from government, producers and cane farmers, establishes quality standards, production quotas and sugar prices in the country. The Ministry of Agriculture & Industry maintains a sugar cane section whose director, Ing. Carlos Ramírez, has visited most of the cane-producing areas of the world. Costa Rica is an interesting combination of modern and primative production methods.

Sugar's Progress in

HUMAN RELATIONS

Roy J. Leffingwell

A Case Study on Productivity

THE Anaconda Reduction Department, Anaconda Company of Montana, U.S.A., was faced with an acute emergency in 1956. Actually, it was a fight for survival. Rapidly falling prices of zinc and copper had dropped some prices below production costs. Cost reduction was the only avenue for survival.

The end result was that some 300 less employes in 1957 produced more than in the previous year, and at substantially lower unit cost. And, the entire reduction in force was carried out through natural attrition, without layoff.

The United States Chamber of Commerce presented Anaconda with a top award for their outstanding program which resulted in lowering unit costs, increased productivity, and building a better spirit of employe co-operation and participation throughout the plant.

Company officials agree that costs could not have been cut without the full co-operation of employes, and their union. The policy was adopted to call in the union committee in advance of making any major change and discussing with them the reasons behind the change.

A slogan was adopted, "Co-operation requires understanding—Understanding requires information". Communication with employes thus became the key to the success or failure of the cost reduction drive. A four-point communication goal was set:

1. Tell our employes what's happening.
2. Tell them why.
3. Tell them how it affects their interests.
4. Tell them what they can do about it.

Anaconda mobilized its major employe communication tools behind the "tell-employes-everything" program. This included:

24 issues of the Management Newsletter
Issues of *The Arrowhead*, company employe publication
42 bulletin boards
21 separate letters sent by management to employes
6 dinner meetings with supervisors
1 dinner meeting to honor 167 employees who had more than 25 years of service and to ask for their suggestions
16 meetings by each foreman with his employees
128 safety meetings
23 meetings with employes on business operation problems.

The amazing success of the Anaconda program in increasing productivity, reducing unit costs and building a better spirit of employe co-operation and participation points up what can be done through dealing more effectively with human relations.

No similar cases have come to my attention in the sugar industry. However, there is every reason to believe that employe co-operation and participation can get similar results in almost any company—provided the program is skillfully handled.

Employee Benefits—Vacations

Vacations were originally conceived as a reward for faithful attendance, and work over a given period of time. But, today they are increasingly being viewed as an earned right.

The purpose of a vacation is recreational, to build up employe's health and stamina for the coming year's work. Unionized workers in most parts of the free world get some vacation time if their length of service justifies it. And, most office workers get vacation periods.

The extent to which hourly-paid workers have gained vacation privileges with pay can be seen in United States Bureau of Labor statistics. In 1940 only 25% of workers covered by union contracts enjoyed vacations. In 1957, some 95% of employes under union contracts had vacations. Moreover, half of these workers qualified for vacation periods of three weeks or more.

Vacations based upon union contract provisions have been held by U.S. courts to be an earned right—not a mere gratuity. Non-union employers are tending to view vacations in a similar light today.

In fixing the length of vacations most employers follow the general rule that an employe's vacations should vary with his length of service with the company. Graduated plans are preferred as most employers consider offers of longer vacations as one means of keeping employes, and rewarding those who remain with the company for an extended period of time.

For production workers, an accepted plan in the U.S. is to give one week's vacation after the completion of the first year of service with a company, and two weeks' vacation starting with five years of service. However, there is a growing trend to give two weeks after the first year.

Office workers in the U.S. generally get two weeks' vacation after the first full year of employment. Many companies give a third week after 5, 10 or 15 years of service. Some organizations give a fourth week after 15, 20 or 25 years of service.

Most employers reserve the right to set the time when vacations will be taken. Of course, most companies try to give time off when employes ask for it. But, production requirements come first. Splitting vacation days into more than one period during the year is not favorably considered in most companies.

Pay in lieu of vacations is not looked upon with favor by most organizations. It is felt that vacations are given for relaxation purposes. Employes are expected to leave the job and do something different for a few days.

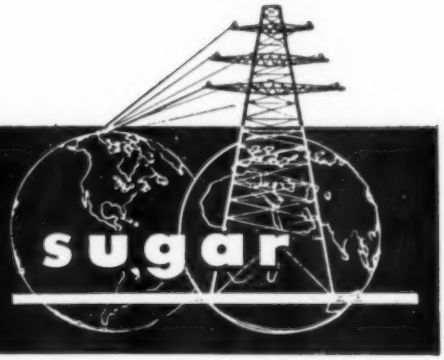
The forfeiture of vacation time in whole, or in part, is not a wise disciplinary measure—as many companies have found out.

Sugar industry employes in Australia, working under the Sugar Industry Award, have been granted a general wage increase of five shillings (about 50c U.S.) per week. Piecework cutters were given an increase of 21½ pence (about 2c U.S.) per ton. The court also proposes to adjust the rates for piecework cutters who cart cane.

The Hawaiian Sugar Planters' Association recently awarded $11,000 in four scholarships. These scholarships are given annually to students taking engineering degrees. Upon graduation, the scholarship winners become assistants-in-training at the Experiment Station of HSPA. Following a post-graduate course, they have an opportunity for employment in the industry.

Nausori mill in Fiji will be closed down after the 1959 crushing. All raw sugar that can be successfully marketed will be produced at the four other Fiji mills. In the meantime, Colonial Sugar Refining Company, owners of all mills on the island, is co-operating with the Fiji Department of Agriculture in investigations and developmental work to provide agricultural and pastoral activities to take the place of cane on Nausori lands.

facts about sugar



SEPTEMBER 5, 1958: Cumulative refined sugar deliveries to August 30th were 5,886,000 tons, compared with 5,839,000 tons during the corresponding period in 1957. During the month of August, distribution ran about 50,000 tons ahead of that month last year. This gain was largely attributed to the virtual exhaustion of excess "invisible" inventories (i.e., those held by industrial users), according to B. W. Dyer & Co., Sugar Economists & Brokers.

Domestic spot raw sugar prices declined to $5.72 per 100 pounds in mid-August, as distress sales of Philippine cargoes took place. In some cases, these Philippine shipments had actually entered port before being sold. Later, after these distress sales were consummated, prices rebounded sharply, and in the latter part of August the spot price reached a new high for the year of $5.85.

Cane refiners reduced their prices $.20 per 100 pounds, effective September 2nd, in Chicago West, New Mexico, Oklahoma, Texas and Rocky Mountain territory, except for individual packets, making the price $8.85 for granulated sugar in 100 pound paper bags. This reduction, which brings refined cane sugar prices more in line with the normal differential over beet sugar, undoubtedly reflects the more intensive competition resulting from refilling the pipelines after settlement of the Hawaiian strike.

In the Northeast, the supply/demand picture is much tighter. The U. S. Department of Agriculture reports that Gulf and East Coast refiners' stocks and prospective supplies from offshore areas, except Hawaii, during the latter part of the year will be almost 200,000 short tons below those of last year. However, new crop mainland cane raw sugar is expected to be 133,000 tons larger this year than last, but this will be available only to the Gulf and South Atlantic refineries, starting around the middle of October.

The Department of Agriculture did not commit itself on anticipated arrivals of Hawaiian raws in the Northeast, but we estimate that 50,000 to 100,000 tons will be available in this area during the rest of this year. Hawaii may be able to fill a small portion of its reallocated quota deficit, according to recent estimates. Under the U. S. Sugar Act, a deficit reallocation may always be filled by the producing area if circumstances permit.

Philippine sugar production from the 1958/59 crop, based on a preliminary estimate, will amount to 1,289,019 short tons, compared with an estimate of 1,350,720 tons for 1957/58. Nevertheless, the 1958-59 crop should be sufficient to fill the 1959 U. S. Quota, with the usual early shipment of part of the subsequent (1959-60) crop.

The world (#4) price has been strengthened recently by new war fears from Communist threats to seize Quemoy and other islands off the Chinese coast. Nevertheless, the spot price of 3.53c per pound on Sept. 4th was still well below the 3.85c peak reached in July during the Mideast crisis.

Sugar Prices Sept. 4, 1958

Ex. Duty Raw Sugar N. Y.	**5.85**
Average #6 Raw Sugar Jan. 1 to Sept. 4	**5.71**
Refined Sugar Gross N. Y.	**9.35**
#4 Raw Sugar (f.o.b.) Cuba	**3.53**
Average #4 Sugar Jan. 1 to Sept. 4	**3.50**

Future Prices	*Contract #6*	*Contract #4*
October 1958	—	—
November 1958	**5.83**	—
March 1959	**5.65**	**3.49**
May 1959	**5.66**	**3.49**
July 1959	**5.73**	**3.50**
September 1959	**5.73**	**3.51**

F. O. Licht reported recently that conditions in Europe indicate that only a fair or average beet crop can be expected in 1958. However, favorable weather conditions during the balance of the season could improve the sugar content. Beets in Western, Northern, Eastern and Central Europe have been hindered this season by late germination and rainy weather. In the Southeastern part of Europe a good crop is expected, but in Turkey, Italy and Spain prospects have been considerably reduced because of continuous drought.

Russia will not be able to fill any of its world quota of about 220,000 short tons, raw value, according to London reports. This indicates that the Russian crop is not as large as previously estimated. It was also reported that Cuba will get about 130,000 short tons of this, and the Dominican Republic about 33,000 short tons.

Cuban exports to the U. S. to August 15th totaled 2,541,613 short tons, raw value, compared with 2,251,655 short tons during the corresponding period last year. Exports to other countries amounted to 2,011,091 short tons versus 2,036,250 short tons to August 15, 1957.

Cuban sales to the world market to September 1st amounted to 2,557,266 short tons, raw value, according to a survey by Willett & Gray, Inc., compared with 2,832,781 short tons to that date last year. During August, these sales totaled only 81,476 short tons, in contrast to 339,696 tons in July, B. W. Dyer & Co. reports.

Hawaiian Technologists To Iran

HONOLULU, T. H.: As the harvest proceeds on the 1958 Hawaiian sugar crop it becomes apparent that a few plantations suffered heavily, and others were only slightly affected, by the 126-day strike of union labor earlier this year. Waialua Agricultural Co. forecasts a 60,000 ton raw sugar crop. The original estimate made a year ago was for 63,000 tons in 1958. This is an estimated drop of only some five per cent because of the strike.

Ewa Plantation Co., located only a few miles from Waialua, reports that some of their fields are being harvested only because it is the quickest method known of clearing them. Fields that normally produce 125 to 150 tons of cane per acre are this year producing only three tons. Efforts have been made in some fields to rake the badly damaged cane into windrows and then burn it. But, it has been found that it takes weeks and lots of oil to get rid of cane in this manner. Many of Ewa's fields are recovering, following the strike, but the plantation has been hit a serious blow.

Pioneer Mill Co., on the Island of Maui, is another plantation to suffer heavily. Estimates are that they will produce 35,511 tons of raw sugar this year. This is 43% less than their 62,232 ton crop in 1957. Grove Farm Co., on the Island of Kauai, say they will lose some 31% of their crop this year.

A California newspaper, the Richmond Independent, located near Crockett—hometown of the big California and Hawaiian Sugar Refining Co. refinery—recently warned editorially that Hawaii's sugar position is precarious.

The paper commented that unless Ha-

waii's sugar industry and the workers learn to work together for the sake of jobs and profit alike, they will find themselves crowded out of the picture by the growing sugar beet industry.

A wholesale grocery organization also sent bulletins to 650 retail grocers, after the Hawaii strike, urging them to continue to handle both cane and beet sugar because of the unrealiability of the Hawaiian source. The bulletin said that because of the erratic supply of C&H sugar grocers would have had no sugar to sell without beet sugar.

Several developments have taken place in recent weeks in connection with the $23 million, 10,000 acre, plantation and refinery in southern Iran in which C. Brewer & Co. of Honolulu is affiliated with the prime contractor for sugar development.

The Hawaiian Agronomics Co. (International) has been organized under Liberian laws to operate within Iran on the job.

L. S. McLane, former manager of Hilo Sugar Co. who represents C. Brewer on the project as top man, passed through Honolulu following initial discussions in Iran. He was enroute to Los Angeles for meetings with Ralph M. Parsons Co. This is the contracting and engineering firm holding prime contracts on the Iran project.

H. M. Robinson, former treasurer and director of Alexander & Baldwin—another sugar agency in Honolulu—has joined the staff of C. Brewer & Co. as coordinator of the Iranian project. The appointment is on a temporary basis, according to Donald J. Martin, Brewer Vice President who made the announcement. Mr. Robinson will be stationed in Hawaii.

W. A. Henk Buddingh' has been named as design engineer for the Iranian project by Brewer. He will spend most of his time in Los Angeles working on design phases of the new sugar factory and refinery.

Mexico To Ask Higher World Quota

MEXICO CITY: The steady modernization of Mexican sugar mills, increases of areas devoted to cane cultivation and higher yields of cane and sugar through uniformly adopted modern production standards, has resulted in an average increase of national sugar production at a rate of 8.6% per year.

With both the federal government and the industry earnestly pushing an improvement and development program, the Department of Foreign Economy believes that, conservatively, at least 1,650,000 short tons will be produced by Mexico in 1962, and possibly more.

This growth is needed to keep up with Mexico's commitments, both internal and external. For example, the Department of Economy figure for sugar exports this year mentions at least 115,700 short tons. Aside from the 82,500 tons assigned to Mexico by the International Sugar Agreement, there are 14,100 tons of refined and 19,100 tons of raw sugar scheduled for shipment to the U. S.

But with conservative final estimates for this year's cycle, indicating a production totaling 1,245,000 tons (or 124,000 tons more than in the previous cycle), the upswing presents a growing industry problem of supply and demand.

Whereas internal consumption has been increasing at around 7.4% annually in the past five years, the statistical upward curve has recently shown signs of leveling off. This year, internal consumption is pegged around 1,045,000 tons, which means a surplus of 198,000 tons if the production estimates are achieved.

Based on the above situation, Mexico's representatives at the September Geneva sugar meeting will fight hard for a new pact which will permit the republic to export double its present 82,500 ton quota. Heading the delegation will be chief executives of the National Union of Sugar Producers.

Mexico's sugar industry requires a higher export quota for other reasons besides accumulation of excessive surpluses. In the past six weeks both cane and mill workers have again asked for wage increases.

The Mexican Union of Sugar Cane Producers has informed the Union of Sugar Producers that it wants a 25 centavo (two cents U.S.) increase in actual price paid for cane, with this being 1.50 pesos (12 cents) per kilogram. At this writing the matter is still being negotiated but with cane producers threatening a strike, capitulation of mills is inevitable.

The Union of Sugar Industry Workers, meanwhile, is not only asking for a general 40 per cent wage increase, but also other costly fringe benefits including management support of clinics for sugar workers, financial aid in payment of rent or construction of houses for mill workers, etc. The current contract expires this forthcoming November 16th, and a labor-management dispute is in the making, since the latter insist they cannot meet such "exhorbitant demands".

Roberto Garcia Mora, of the San Cristobal Sugar Mill (world's largest) has announced he has in project the establishment of a paper mill to utilize cane bagasse which now is burned. Garcia Mora mentioned an investment of 150 million pesos ($12,000,000) in the new plant. Technicians and specialists in production and industrialization of cane bagasse are working out details at San Cristobal, including Roger P. Humbert, assistant chief of the Hawaii experimental station, Dr. S. J. P. Chilton of the University of Louisiana and J. A. Bonnet, chief of the soils department of the Rio Piedras experimental station in Puerto Rico. These latter three experts, aside from suggestions about the proposed utilization of bagasse, also instructed personnel in new processes for production of alcohols, and initiated studies for industrialization of cane syrup and other aspects of the industry.

The bagasse paper mill, which will go up

Richard J. Hecker, center, winner of the first $14,400 Beet Sugar Development Foundation fellowship at Colorado State University, gets filled-in on his job by Dr. Leroy Powers, left, head of the U.S. Department of Agriculture Sugar Crops experiment station at Fort Collins, Colorado and James H. Fischer secretary-treasurer of the Foundation.

on San Cristobal property, will produce all types of paper, Garcia Mora said, with the exception of newsprint.

Variety Recommendations For Louisiana

Favorable weather for the sugarcane crop continued to prevail in Louisiana during the month of August and the canes, generally speaking, are about up to "normal" for this time of the year. Lloyd L. Lauden, Agronomist of the American Sugar Cane League, estimates the cane crop in the Louisiana fields at approximately 23 tons to the acre, and this estimate is about the same as the estimate of the U.S.D.A. Crop Reporting Board based on conditions prevailing August 1st.

Cane planting time has already arrived in the Louisiana sugar district and the farmers are busy planting the fields that will produce next year's plant crop and the stubble crops for two years thereafter.

The Louisiana State University Agricultural Experiment Station at Baton Rouge, Louisiana and the United States Department of Agriculture Sugarcane Field Station at Houma, Louisiana, have issued joint recommendations for planting in the various soil types of the Louisiana sugar belt and we believe that these recommendations will be of interest to cane farmers throughout the world. We quote from these recommendations:

"At the present time C.P. 44-101 appears to be the most valuable variety for general planting in all areas and on all soil types in the sugarcane district except in the Red River Area, where yields of N. Co. 310, C. P. 48-103, C. P. 47-193 and C. P. 36-105 have been above those of C. P. 44-101 and where heavy borer infestations are allowed to develop. While C. P. 44-101 is recommended generally as the major cane, other varieties have a place for certain purposes.

"N. Co. 310 has given yields of cane and sugar above those of C. P. 44-101 on both light and heavy soils, and is more tolerant to cold, but it is later maturing. It is more likely to lodge than C. P. 44-101, but when lodged can be handled with harvester pick-up attachments with less loss than a variety such as C. P. 36-105 which, because of its brittleness, breaks when the stalks are straightened by the harvest machines. It is susceptible to both mosaic and red rot and cane to be used for seed should be inspected for mosaic and rogued where necessary.

"C. P. 48-103 and C. P. 47-193 have shown superiority over both C. P. 36-105 and C. P. 44-101 in some tests. C. P. 48-103 is by far the earliest maturing variety available, and a sufficient acreage should be planted for harvest during the early part of the harvest season. C. P. 47-193 is also earlier maturing than C. P. 44-101 and should be grown on the heavier soil types; however, it does not withstand freeze injury as well as C. P. 44-101 and also has a higher inversion rating. It should therefor be harvested first.

"Many growers are still obtaining satisfactory results with C. P. 36-105, which is slightly earlier maturing than C. P. 44-101. It has responded to heat treatment for control of stunting disease. Cane grown from treated seed may be slightly lower in sugar content than untreated, but should produce satisfactory sucrose for medium early harvesting. It is more resistant to borer injury than C. P. 44-101 but does not withstand freeze injury as well.

Dr. E. V. Abbott, Superintendent of the U.S.D.A. Houma Sugarcane Field Station, recently reported finding a new strain of sugarcane mosaic disease in Louisiana. The disease was first discovered in the fields of the big Raceland Plantation and is apparently confined to the eastern part of the sugar district. Efforts are under way to

(*Continued on page* 61)

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SUGAR y AZÚCAR — Dr. O. W. Willcox, Editor

Agriculture

Losses in Transferring Anhydrous Ammonia

MANSEE MAYEAUX. *Sugar Bulletin*, Vol. 36, No. 18, p. 231 (1958).

Research at the Louisiana Agricultural Experiment Station shows that the loss during transfer of anhydrous ammonia from the original tanks to the tank trucks for distribution to the fields averages about 3.5%. It is estimated that the Louisiana planters lose about 710 tons of this valuable substance a year, and there is a need for more careful handling. The common method is simply to vent the large tank and allow the liquid ammonia to flow by gravity into the distributing tank. In this process some of the ammonia evaporates.

The recommended method is to utilize the pressure existing in the "nurse tank" for operating a pump which effects the transfer in a closed or semi-closed system, that reduces the loss by 0.7%. Such a pump can be installed at a cost of about $150.00.

■

Effect of Repressing the Mother Shoot of a Cane Stool to Promote Tillering

L. H. LI and L. H. CHOU. Report Taiwan Sugar Experiment Station, Vol. 16, No. 1, P. 60 (1958).

On some plantations in Formosa it has been a practice to mutilate the primary shoot as a means of forcing an increase of the number of tillers. In some cases it has also been a practice of keeping the tillers evenly spaced by tramping earth between them, thus spreading the cane stool. Field experiments were made to evaluate these practices; five varieties were used.

The sugar yields of most of the varieties were decreased by mutilation of the mother shoot. As regards the method of spreading the stools by packing earth between the tillers, the results appear to be somewhat mixed. This treatment gave a significant increase of yield of sugar between N:Co 310 and F 134, a significant loss (12%) of sugar yield for PT 43-52, and a significant increase of 12% in sugar yield from F 108, which is a notoriously poor tiller.

The general impression is that although more tillers can be produced by either method in the early stage of growth, this advantage on the whole is not enough to affect favorably either the number of stalks or the cane and sugar yields; though the number of tillers is larger their lengths are shorter. However, there seem to be exceptions.

Competing Ability and Yield Among Cane Varieties

C. S. YANG. Report Taiwan Sugar Experiment Station, No. 16, pp. 37-48 (1957).

Recently, cane breeders in Hawaii have adopted what is called the "bunch method" for testing new cane seedlings for possible use in commercial planting. Previously, the method of testing consisted in selecting the best looking seedlings and planting them separately. In the "bunch method", four, five or more selected seedlings are planted together in the same hill. One advantage of the "bunch method" is that more seedlings can be tested on a given area; the principal advantage, however, is that when several seedlings are grown closely together it is much easier to see which are the best ones than it is where they are widely separated, as on separate plots.

In the Taiwan experiment, five well known commercial varieties were planted in bunches of five, and also separately (one variety to a hill). It was found the yields of these varieties were parallel in both the bunch-planted plots and on individual plots. This signifies that the "bunch method" is well suited for the purposes of selection in cane breeding.

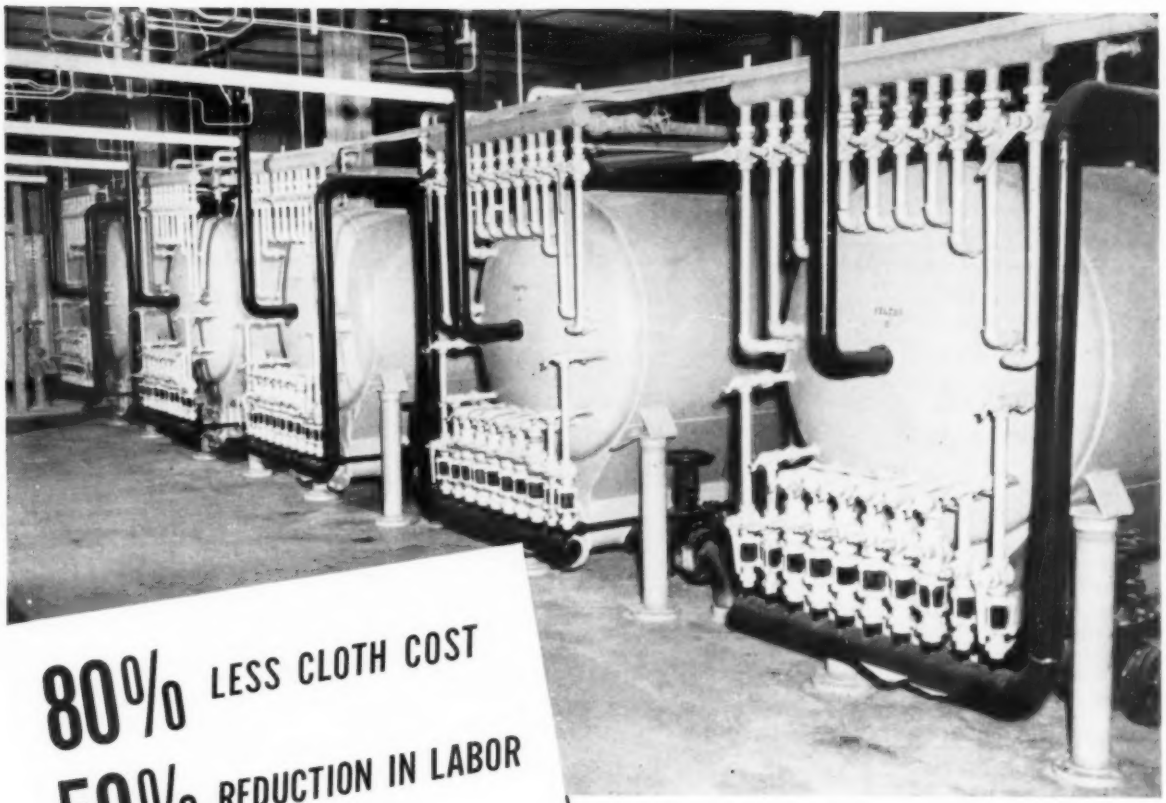
■

The Jex Mulching System in South Africa

H. W. KERR. *Proceedings* Queensland Sugar Cane Technologists, Vol. 25, p. 27 (1957).

The system of mulching the fields with cane trash developed by Frank Jex in Natal is attracting much attention. Burning of trash before harvest was once common in South Africa. But the cane lands of Natal are largely hill slopes, and this policy was very wasteful of soil fertility, due to excessive erosion of the land. In recent years the sugar cane industry in that country has largely abandoned the burning practice, and it is found that trash conservation has provided a means of conserving soil and moisture, as well as affording efficient weed control.

Among the methods used in this connection the Jex method seems to be outstanding. Over a period of 15 years he has evolved a procedure which is both simple and very effective. He found that the best results were obtained, essentially by doing nothing to the cane trash but leave it where it fell or was stripped from the stalks at harvest. When the ratoon shoots come up through the mulch, a liberal application of fertilizer of the right type is made on top of the trash, and the response of the cane has been most spectacular; in fact, the annual crops now are equal in weight to the two-year crops formerly harvested. The average rainfall on this farm is about 40 inches and cane yields



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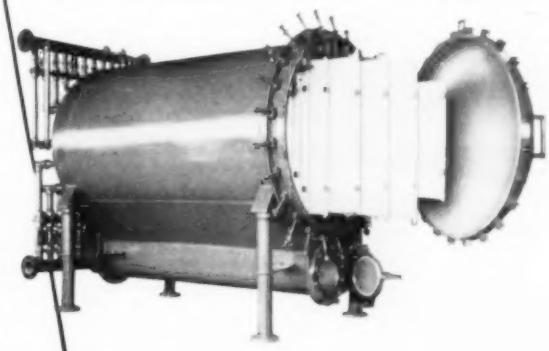

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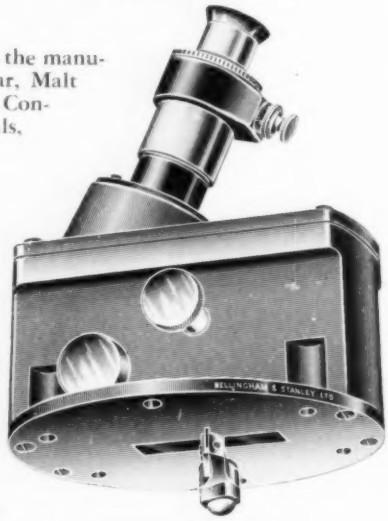

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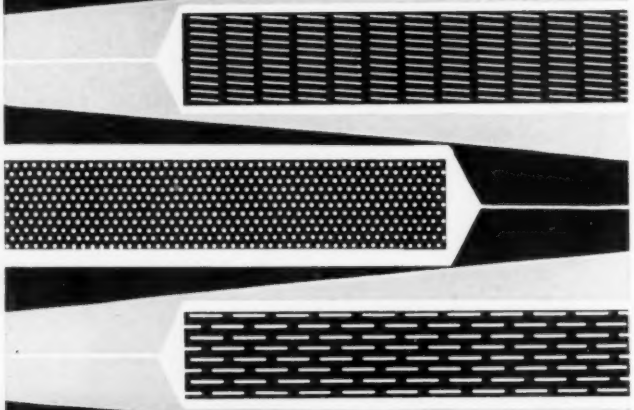

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of 40 to 50 tons are not uncommon. The only time that the land is likely to suffer is when plowing up and replanting the field has become necessary. Under this policy the aim is to produce as many ratoon crops as possible, and it is now common to find that fifth ratoons are yielding as much as the earlier ratoons of the rotation.

The opinion is now that this development is one of extreme interest, which should be followed by agriculturists in all cane-producing countries because of the advantages it offers on all counts.

The Jex system is compared with trash conservation as practiced on the island of Mauritius, where the cane is generally not burned. Here, however, the trash is usually "rolled" from one row to the next, so that one-half the land area is left bare each year. The South Africans have tried this method and have found it inferior.

(Whether or not the Jex system can be applied in all cane-growing regions is a matter for conjecture, but it at least seems to have three powerful attractions. One is that it is an effective means of preventing soil erosion on sloping lands. Another is that a one-year crop under trash may yield as much as a two-year crop without trash. The third is the excellent weed control which is obtained without additional cost. These three advantages could perhaps outweight the cost of hand stripping the cane.—Editor)

■

Successful Rain Making in the Philippines

AUGUSTIN KILAYKO and JESUS SUAREZ. Philippine Sugar Institute *Quarterly*, 1958, No. 1, p. 3.

For the first time in the Philippines the artificial precipitation of rain has been successfully accomplished, with results beyond expectation. During the normally wet season there was a persistent drought in Negros Occidental from November 1957 to the middle of February 1958. The 1957-58 sugar crop was being adversely affected and planting for the next crop was being prevented. Early in February, operations were started to produce artificial rain by two methods—salt water sprayed by airplane in the passing clouds, and dissipation of silver iodide from the ground. From February 19 to March 11, thirty-seven cloud-seeding flights were made whenever meteorological studies indicated favorable cloud conditions. Good local showers, some amounting to general rains, were obtained as the result of eleven successful flights.

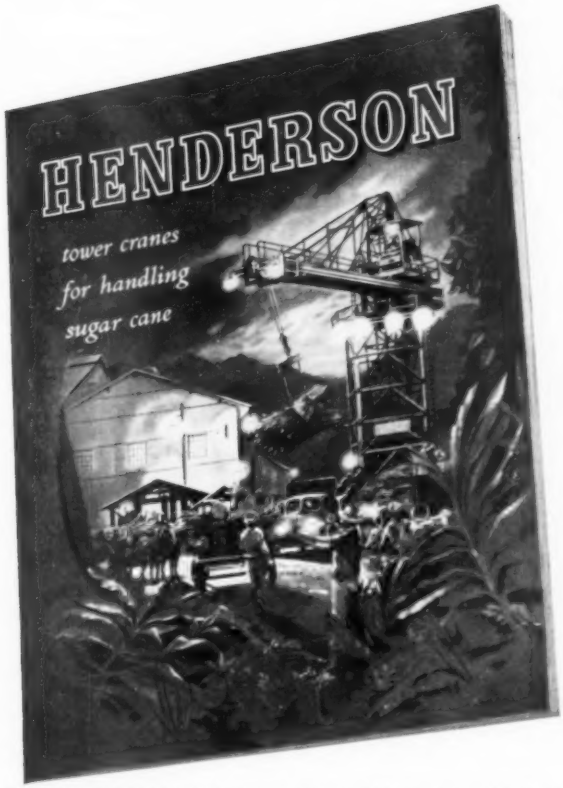
Farmers throughout the drought area reported large benefits from these rain-making operations. It is estimated that, otherwise, 10 to 20% of the dying crop, which would have been lost, was saved, and planting of the next crop was made possible.

■

Effect of Soil Fumigation on Growth of Sugar Cane

H. T. CHU and T. K. TSAI. Report Taiwan Sugar Experiment Station No. 16, pp. 78-79 (English Summary).

On a poor sandy soil after the harvest of a ratoon crop, a series of plots were treated with five fumigants or disinfectants: D-D mixture, Arthofume 85, Formalin, Agrosan GN 5, and Chlorofin 22. All were found to be effective in inducing a better growth and higher yields of cane and sugar; the best results were obtained with Orthofume 85; Agrosan GN 5 was the least



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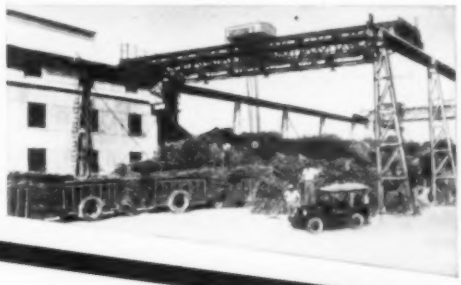

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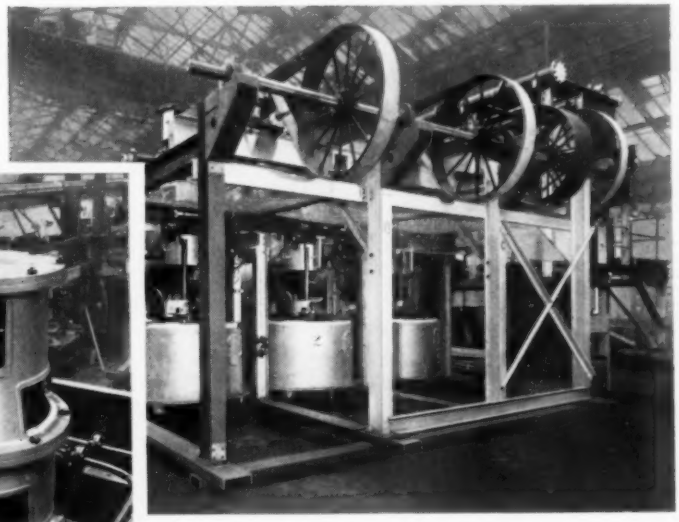

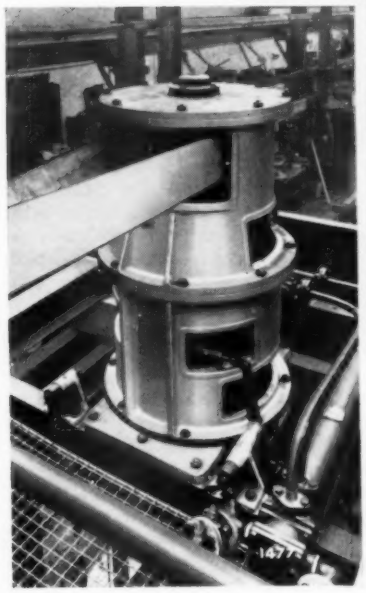

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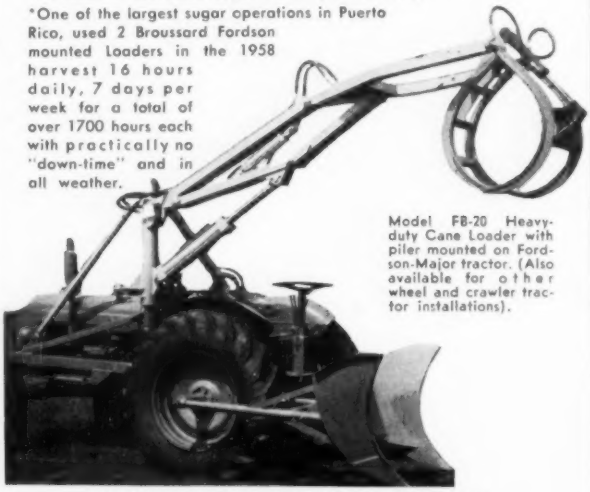

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effective. The effectiveness of the soil treatment showed itself in increased number of tillers per stool and increased lengths and diameters of the stalks. The number of dead stalks per stool was also higher in the treated plots, since these plots contained more tillers than the check plots. Sugar yields were as high as 2-3, 5 times in the treated than in the check plots.

Tests were also made in pots for a comparison between the effects of the fumigants and the effect of sterilization of the soil by dry heating. The cane in the pots treated with the fumigants grew well but grew even better in the heat-sterilized pots. This indicates that the results in either case were due simply to killing off the harmful microorganisms existing in the soil. No figures are given to show costs of the treatments.

Books

Ten Dynamic Years: A Report on the Hawaiian Sugar Industry

A. G. BUDGE. Published by the Hawaiian Sugar Planters' Association, Washington, D. C., 40 pp. (1957).

This small book tells the story of the Hawaiian sugar industry from 1947 to 1957 inclusive, and a highly suggestive and interesting story it is.

The story begins with a sketch of the industry as it stood in 1947 (the first normal post-war year), and shows how—and why—the picture changed during the next ten years. In 1947, the employee population of the industry was 27,300; by 1957 it had dropped to 17,000. In 1947 the average daily wage of hourly rated workers was $7.63; by 1957 it had risen to $11.16, plus $3.60 in "fringe benefits" (pensions, welfare, etc.), bringing the total daily wage to an average of $14.74. In 1947 the yield of sugar per acre on an average Hawaiian plantation was around 3.3 tons; at the close of the 1956 crop, the average yield had tripled to 10.28 tons, without any significant change in total acreage under cane.

These abbreviated statistics reveal that as the number of hourly workers in the Hawaiian sugar industry decreased by 37%, the yield of sugar per acre increased by 300% which means that in 1957 one man was producing more than five times as much sugar as one man was doing in 1947.

The reader is immediately curious to learn how this spectacular gain in labor efficiency came about in such a relatively short time. As he reads on he becomes aware that this transformation was more in the nature of a sociological than a technological revolution. Or, to say it in other words, here is a case where the technologists have been obliged to adjust their operations to an overriding social force.

Shortly after the close of World War II the Hawaiian sugar industry had become thoroughly unionized and was operating as a "closed shop" whose leaders happened to be unusually skillful and resolute negotiators. They presented demands which the companies rejected as ruinous. An industry-wide strike followed, and in the end the companies had to give in or suffer enormous losses from deterioration of their growing crops. In subsequent years the union made new and larger wage demands which it succeeded in enforcing. The companies were thus caught in a squeeze between higher labor costs on the one hand, and on the other hand the United States Sugar Act, which imposed on them production quotas and a limit on the selling price of their sugar. Since they can neither keep wages down nor raise the price of sugar the only escape from financial ruin would be to improve their technology and thereby increase the output of sugar per man.

The story of these "Ten Dynamic Years" proves that the Hawaiian sugar technologists are equal to the task. In all de-

partments old-fashioned equipment and processes have been replaced by better ones. In the fields, virtually every major operation has been mechanized to save both time and labor. Huge gang-plows prepare the soil of large fields in short order. The cane crop is quickly planted by machine and kept free of weeds by mechanically spread herbicides; the ancient hand hoe and row cultivator have been junked. One man in an airplane can now distribute fertilizer over hundreds of acres in one day and can do the same with insecticides to protect the crop from destructive bugs. Instead of being cut by hand the ripe cane is harvested by giant rakes and carried speedily in huge trucks, travelling over excellent roads, to the factory where it is crushed in faster operating, automatically controlled mills. The expressed juice is automatically purified, boiled to sugar which is automatically separated from the molasses and mechanically shunted to storage or ship's hold, all with a minimum of human intervention by a minimum personnel. In spite of the fact that every new union contract has increased the need for greater economy of time and labor, the technologists have managed to master the situation and keep the companies solvent.

The detached reader may wonder how long this see-saw between labor and technology in the Hawaiian sugar industry will keep up? A crisis must come when the companies are pressed too close to the limitations of the Sugar Act; there would then be no possibility of profit and the industry must necessarily cease to exist. But the situation need not come to such a pass so long as the technologists are able to come to the rescue with new forms of labor saving. The mechanical engineers in the fields and the process technicians in the factories still have promising ideas under development and the cane breeders at the HSPA's magnificent sugar experiment station have before them a prospect of obtaining new seedling canes that of themselves will reduce field costs simply by yielding more sugar in the same time from the same area of soil and the same amounts of fertilizer.

This prospect is closer than is generally understood. A recent development in the science of plant life indicates that the yield of any kind of crop is inverse to its percentage content of nitrogen. The present nitrogen content of good sugar canes is of the order of 0.285%. If the cane breeders could develop an otherwise suitable variety with as little as 0.200% of nitrogen it should yield, in the limit, as much as 300 tons of cane containing 33 or more tons of sugar per acre, without requiring heavier fertilization than an inferior variety. Such an agrobiological achievement is definitely possible though perhaps in the distant future; when and if it comes it would reduce present field costs of sugar by half. Ironically, it would also reduce the field labor force in about the same proportion.

■

Sugar Cane: Origin, Classification, and Characteristics of Representative Clones

ERNST ARTSCHWAGER and E. W. BRANDES. Issued 1958 as *Agricultural Handbook No. 122* by U. S. Department of Agriculture; 307 pp., $1.25.

The authors write a succinct account of facts and theories on the origin and distribution of sugar canes whose progeny are now in common use on the world's sugar cane plantations. The original home of this valuable vegetable is supposed to have been Indonesia, southeastern Asia, and Polynesia. Various expeditions have visited these regions and numerous clones of distinct types are now available in collections from which material for breeding purposes is obtainable. There are four principal groups of these canes: the Hawaiian, the New Caledonian, the New Guinea, and the miscellaneous group. Detailed descriptions and taxanomic key of 350 clone types, with numerous drawings, are given. This book will be of interest to cane breeders everywhere.

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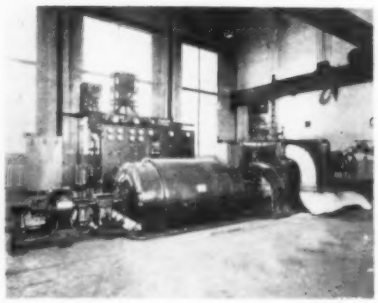

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Facts

(*Continued from page 53*)

prevent the spread of the disease to the western section and with this in mind the American Sugar Cane League has announced that no seed of the newly released variety C. P. 52-68 will be moved from the eastern area into the western area of the sugar belt.

Receipts of offshore raws at New Orleans during the month of August amounted to 115,322 tons of Cubas, 5,338 tons of Virgin Island raws, 2,819 tons of raws from Mexico and 4,518 tons of raws from the Philippines. All tons are long tons. Breaking down the receipts for the individual refiners, the American received 353,560 bags of Cuban raws, 72,288 bags of Philippine raws, and 5,249 bulk tons of Cubas. The receipts to National amounted to 62,375 bags of Cubas, 5,338 long tons of Virgin Island raws and 28,703 bags of Mexican raws. All sugars to Colonial were in bulk and amounted to 8,254 long tons of Cubas. Supreme received 161,292 bags of Cubas; Henderson 91,750 bags of Cubas; South Coast 64,417 bags of Cubas; Southdown 110,970 bags of Cubas and Industrial Sugars of St. Louis 7,547 bags of Cubas.

End of the Puerto Rican Crop

The 1958 season in Puerto Rico terminated on August 3 when Central Mercedita, the last mill to remain in operation, ceased grinding. This year the 30 active mills turned out a total of 922,938 tons of 96° sugar, the lowest production in the past 12 years. The average yield obtained was 10.178%, which is the lowest recorded in the last 30 years. The low production and the poor yield are principally due to adverse weather conditions: drought during the period of growth and excessive rains during harvest. Due to high costs of production and other unfavorable conditions the sugar production has been gradually declining during the past five years.

The Outlook Committee of the Sugar Industry has unanimously adopted a resolution aiming at increasing productivity and thereby increase the incomes of the workers of the sugar industry; this scheme contemplates a system of piece work, with the payment of incentives for all work above the norms specified for each type of work. A minimum wage would be guaranteed.

Beet Harvest in California

Los Angeles, Sept. 4: Fall harvest of California's huge sugar beet crop—largest in the nation—is now in full swing.

Mechanical harvesters are busy digging and loading the sugar beets in 30 countries, and U. S. Department of Agriculture experts predict this year's crop will total 3,515,0000 tons.

Ten processing factories have started operations that will continue night and day, seven days a week, until about the middle of December.

A four year fellowship in plant genetics —the first of its kind in the nation—has been established at Colorado State University in Fort Collins by the Beet Sugar Development Foundation, it was announced this week.

James H. Fischer, Secretary-Treasurer of the beet sugar industry group, said that the grant, worth $14,400 for a four-year study course, is the first ever established for sugar beets and will be renewed regularly on a permanent basis.

Richard J. Hecker, 30, an honor graduate of Montana State College at Bozeman, Mont., was awarded the first fellowship and will begin work immediately at the Fort Collins Department of Agriculture Experiment Station under the direction of Dr. Leroy Powers, director of the Sugar Crops section and one of the nation's outstanding statistical geneticists.

Hecker will do research on development of a hybrid sugar beet, one of the most important problems in the industry, with Dr. Powers who also is his thesis advisor. Dr. T. E. Haus, professor of plant genetics, is Hecker's course advisor at the university. Hecker will be the first to receive his doctorate from the newly established Genetics Institute at CSU.

Results of Puerto Rico Campaign of 1958

Sugar Mill	*Tons of Net Cane Ground*	*Per Cent Sugar In Cane*	*Tons of 96° Sugar*
Guánica	650,145	10.690	69,508
Aguirre	644,358	10.536	67,916
Coloso	553,440	11.208	62,033
Mercedita	508,948	10.785	54,897
Plata	464,613	10.455	48,573
Igualdad	392,665	10.894	42,779
San Vicente	425,836	9.466	40,308
Fajardo	393,261	10.116	39,852
Cambalache	345,974	9.472	32,772
Los Caños	328,681	9.604	31,565
Juanita	315,887	9.927	31,365
Canóvanas	295,482	10.220	30,222
Juncos	290,628	9.999	29,061
Eureka	273,701	10.552	28,881
Roig	286,222	9.911	28,368
Lafayette	252,490	10.311	26,035
Plazuela	270,650	9.560	25,752
Santa Juana	252,110	9.470	23,874
Pasto Viejo	238,323	9.380	22,355
Constancia	231,317	9.610	22,231
Rufina	208,446	10.553	21,997
Monserrate	231,783	9.454	21,914
Machete	211,853	10.203	21,653
Cortada	227,719	9.130	20,800
El Ejemplo	148,482	10.330	15,338
Cayey	153,980	9.646	14,852
Guamaní	122,277	10.339	12,788
Soller	124,364	10.165	12,642
Rio Llano	138,621	9.320	12,920
San Francisco	85,080	11.395	9,695
Totals	9,067,336	10.178	922,938

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No 3

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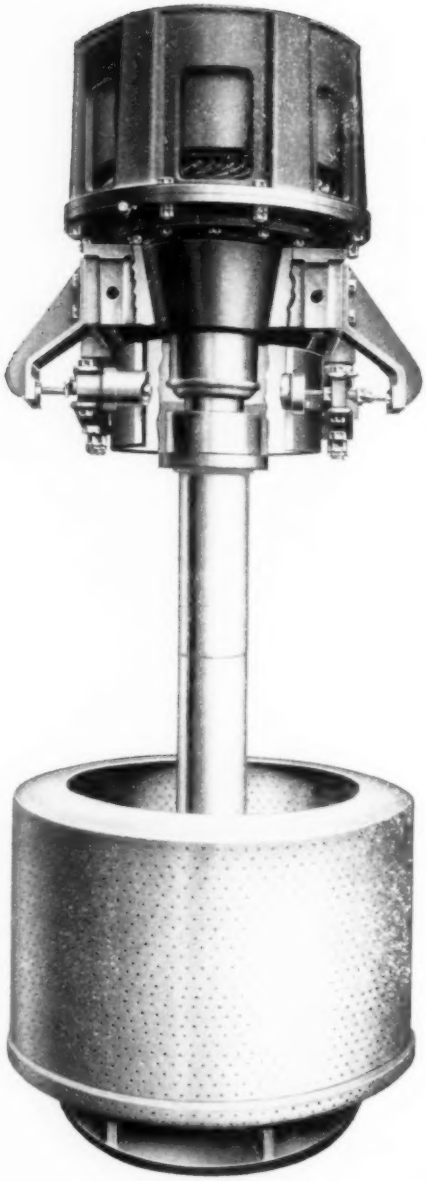

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AZÚCAR

Octubre 1958

Mensaje De Bienvenida A Los Delegados Extranjeros

Por Guillermo E. Ochoa

Presidente de la Asociación de Técnicos Azucareros de Cuba

La Asociación de Técnicos de Cuba que me honro en presidir, dá por este medio su más cordial bienvenida a todos los delegados de paises extranjeros que nos honran con su presencia en esta 32ª Conferencia que se celebra en la ciudad de la Habana durante los días comprendidos entre el 6 y 9 de octubre de 1958.

Una vez más cumple la Asociación los postulados para la que fuera fundada por un grupo de esforzados pioneros, cubanos y extranjeros en el año de 1927, al promover, con estas conferencias anuales, la discusión viva sobre los problemas técnicos que confronta la industria de la caña de azucar.

Guillermo E. Ochoa

El intercanbio de ideas y proyectos, el conocimiento mutuo y las relaciones entre colegas de diversos paises son parte muy principal entre los objetivos que estas conferencias anuales de la A.T.A.C. tienden a conseguir. Y una consecuencia de ello se deriva en el hecho de contar entre nuestros asociados a más de 300 socios que viven fuera del territorio nacional. En paises tan diversos como la India, Brasil, los E. U. de A., México, Puerto Rico, etc. tenemos socios, muchos de ellos que asisten a nuestras conferencias anuales, otros que envian sus trabajos técnicos para ser presentados en las sesiones de trabajo de dichas conferencias, y todos en general unidos por el vínculo de nuestro boletín mensual y de nuestra Memoria anual.

Los tiempos en que vivimos, de un desarrollo tecnológico tan vasto como nunca la humanidad soñó, ha hecho comprender a los hombres que el intercambio de conocimientos es absolutamente necesario y útil para el desenvolvimiento de la economía y la elevación del "standard" de vida de los pueblos menos desarrollados. Sin embargo es de destacar el hecho que la industria azucarera desde tiempo inmemorial ha promovido el intercambio de conocimientos e ideas entre todos los países productores de azucar del mundo y han sido los técnicos azucareros de esos paises los que han llevado a cabo esa labor de acercamiento y divulgación. La Asociación de Técnicos Azucareros de Cuba ha llenado esa función a cabalidad, lo que puede comprobarse al hojear nuestra colección de Memorias en cuyos treinta tomos aparecen infinidad de trabajos firmados por distinguidos técnicos azucareros de diversas nacionalidades y orígenes. Es de todos conocido que el "secreto profesional" no existe entre los técnicos azucareros y que por el contrario cuando un procedimiento dá resultado en una fábrica, en un campo, en un laboratorio, el técnico que ha desarrollado esa idea tiende a divulgar la misma lo más rápida y ampliamente posible. Se nos dirá que ello es factible porque no existe en la industria azucarera esa dura competencia que sufren algunas otras industrias, ya sea en el orden nacional o internacional, pero debido a esa feliz coyontura, los técnicos azucareros de todo el mundo se intercambian sin reserva alguna sus conocimientos e ideas. Y es con ese espíritu abierto, franco y sincero con el que damos la bienvenida a los compañeros de los pueblos amigos que nos visitan y nos honran con su presencia en esta 32ª conferencia Anual de la A.T.A.C. Aprovechamos para ello las páginas de SUGAR Y AZUCAR, que como en el pasado año de 1957, han tenido la gentileza de dedicar a la Asociación de Técnicos Azucareros de Cuba el presente número de dicha revista bilingüe que tanto hace, a través de su páginas, por ese intercambio de ideas y conocimientos entre todas las areas productoras de azucar del mundo.

¡Bienvenidos amigos!

DISCURSO del PRESIDENTE

By Guillermo E. Ochoa
Presidente
Asociación de Técnicos Azucareros de Cuba

La Asociación de Técnicos Azucareros de Cuba inaugura con este acto su 32ª Conferencia Anual. En nombre del Comité Ejecutivo que presidimos damos la más calurosa bienvenida a todos los compañeros asociados, cubanos y extranjeros, y a los distinguides personalidades que nos honran con su presencia en este sencillo y trascendente acto de apertura.

Es casi una costumbre que la misión del Presidente de la Asociación en este acto se reduzca a destacar los méritos, que en el campo de la técnica azucarera y su influencia en la economía de nuestro país, tiene nuestra querida A.T.A.C. pero nos hemos trazado el deber de destacar en nuestra intervención no tan solo los méritos tan trabajosamente ganados, sino también algunas fallas de nuestra organización en un sano afán de crítica constructiva.

Destacar los méritos de la Asociación de Técnicos Azucareros de Cuba es tarea fácil. El pequeño grupo de técnicos que en el año de 1927 fundara nuestra Asociación se ha convertido a lo largo de 31 años de esfuerzos y trabajas constantes en una organización amplia, provechosa y de raices permanentes arraigadas en nuestra comunidad.

Toda nuestra organización tiene su historia, pero pocas tienen un historial tan amplio que llena treinta tomos de nuestras Memorias e incontables volúmenes de nuestro Boletín Oficial. Y todos ellos conteniendo cientos de trabajos técnicos escritos por nuestros asociados con el único fin de mejorar los procedimientos y técnicas del proceso de la caña de azúcar en todas sus fases. Y todos esos trabajos han sido presentados en nuestras Conferencias Anuales o publicados en el Bolétin Oficial, con el máximo desinterés de sus autores, con el único y simple objetivo de que su divulgación contribuya a mejorar el proceso azucarero. Y he aquí, señores, donde radica la fuerza de nuestra A.T.A.C., en su disinterés que es el desinterés de sus asociados. Nuestra labor nunca ha sido lastrada con objetivos utilitarios de ningún género. Nuestras discusiones nunca han sido estériles sino constructivas. Hemos propugnado siempre el bién sin pensar en los que puedan beneficiarse con nuestra labor. Hemos servido a la comunidad y ahí está nuestra obra para demostrarlo.

Sin embargo toda organización tiene necesidad de renovarse, de crear nuevos objetivos, de alcanzar nuevas y más altas realizaciones. En la organización actual de la A.T.A.C. hay dos hechos que han llamado poderosamente nuestra atención y que deseamos destacar publicamente, contando de antemano con vuestra generosa benevolencia.

El primero de estos hechos lo constituye el número y la composición de nuestro asociados. Contamos en la actualidad con 1.120 asociados de número y 112 socios protectores. De los 1,120 asociados de número hay aproximadamente 800 cubanos y 300 extranjeros. Y he aquí la anomalía: ¡Casi un 27% de nuestros asociados de número son extranjeros! Nos orgullecemos de contar en nuestras filas tan elevado número de socios extranjeros, pero no podemos pasar por alto el hecho de tener tan solo 800 asociados de número de nuestra nacionalidad.

Hemos estudiado cuidadosamente este problema y su solución, o sea, el aumento de socios cubanos depende de varios factores que pasamos a enumerar:

Fecha de las Conferencias Anuales. Por el reglamento vegente anteriormente estas Conferencias Anuales se han estado celebrando durante los meses de Noviembre y Diciembre de cada año. Esta época coincide ciertamente con el período de mayor actividad en la reparación de los centrales azucareros. Los jefes de maquinaria y el personal cuya presencia es indispensable en el ingenio por imperativo de esas reparaciones, no podían asistir a estas Conferencias Anuales que son el alma y la vida de la institución. Como resultado de ello cada día es más pequeño el número de jefes de maquinaria que pertenecen a la Asociación.

Este año cumpliendo un acuerdo de la Junta General de asociados, estamos celebrando la Conferencia en la fecha más adelantada que jamás se hayan celebrado y esperamos que con este cambio desaparezcan las causas por las cuales los Jefes de Maquinarias no podían asistir a este evento y consigamos de esta forma un aumento de asociados de este sector.

Atraso en la publicación de las Memorias. Este argumento, muy bién fundado por cierto, ha sido motivo de quejas y malestar entre los asociados traducido en menor número de ingresos y más alto número de bajas. El Comité Ejecutivo que presidimos ha hecho todos los esfuerzos son necesarios para publicar las mismas en un mínimo de tiempo y evitar que los trabajos que se publican en dichas Memorias carezcan de actualidad por el atraso en su publicación.

Valor técnico de los trabajos presentados. Como un medio de atrear un mayor número de socios a nuestra institución es necesario mejorar el nivel técnico de los trabajos que se presentan en nuestras Conferencias Anuales, yá no tan solo en su forma, extensión y presentación, ajustándolo el reglamento vigente, sino en su contenido, en su valor intrínseco y original.

Ampliación y mejora del Boletín. El Boletín Oficial de la Asociación de Técnicos Azucareros de Cuba constituye el vehículo más relevante de intercambio entre la Asociación y sus miembros. Es preciso reconocer que su forma actual puede ser mejorada grandemente. Hay que reformarlo, cambiar si es posible su formato y elevar la calidad de los trabajos que en el mismo se publican. Para esto es necesario que todos los miembros de la Asociación cooperen con el mismo enviando trabajos originales y de alto valor tecnológico. Sería beneficioso tal vez nombrar un director permanente del Boletín y no uno cada año como se acostumbra ahora. Este director permanente, escogido entre tantos técnicos capaces con que cuenta nuestra institución, tendría la responsabilidad plena de la publicación del Boletín. Un Boletín linámico, de verdadero contenido técnico, sería nuestra arma más eficaz en lograr un mayor número de socios para la A.T.A.C.

Estamos seguros que cumpliendo a cabalidad las ideas esbozadas anteriormente y con la ayuda de cada miembro de la institución en una labor personal de captación que es después de todo la más importante de todas, podríamos aumentar el número de asociados de número y trazarnos para nuestra próxima Conferencia Anual de 1959 una meta o tope de no menos de 1.000 socios de número que es una cifra realista y posible de conseguir.

No olvidemos tampoco celebrar, tan pronto las circunstancias lo permitan, la

II Exposición de la Industria Azucarera. Todavía está fresco en nuestra memoria el éxito alcanzado en el año de 1956 con la celebración de la I Exposición. Hechos de esta naturaleza constituyen un excelente medio de divulgación de los objetivos de la Asociación que contribuyen eficazmente a aumentar el número de nuestros asociados.

Hay otro hecho en la organización actual de la A.T.A.C. que siempre nos ha llamado la atención. Los fondos económicos de la Asociación se nutren en la actualidad de dos formas: por medio de las cuotas anuales de nuestros asociados de número y protectores, o por medio de asignaciones o ayuda económica que nos prestan algunas instituciones. Estas instituciones que ayudan a sostener la A.T.A.C., sin cuyo concurso no podríamos afrontar los gastos de nuestro presupuesto, son las siguientes: La Asociación Nacional de Hacendados, con una contribución anual de $4.200.00; el Ministerio de Agricultura con $2.400.00 anuales y la Asociación de Colonos con una cuota anual de $100.00. Y este último hecho es el que deseamos destacar: ¡La Poderosa y nutrida Asociación de Colonos de Cuba sólo contribuye con $100.00 anuales al sostenimiento de la A.T.A.C.!

Naturalmente no vamos a criticar a quienes nos benefician y sostienen sin tener ninguna obligación material para ello, pero permítasenos señalar que entre las distintas secciones de que se compone nuestra Asociación, la sección de Agricultura es una de las más numerosas y entusiastas. A lo largo de nuestras 31 conferencias esta sección ha presentado la cantidad de 350 trabajos técnicos. Estos trabajos han sido firmados por los más destacadaso técnicos cubanos y extranjeros, entre los que destacan los nombres de C. E. Beauchamp, Federico Poey, H. C. Sorenson, Fernando Agete, Luis C. Scaramuzza, Roberto Barreto, Alfonso Fors y otros tan valiosos como los nombrados que escapan a nuestra memoria. Cabe ahora preguntar: ¿Quién o quienes han recibido los beneficios derivados de estas experiencias, de esto desvelos y esfuerzos de tantos técnicos connotados? Principalmente y en mayor alcance los colonos de Cuba. Creemos sinceramente que la Asociación de Colonos de Cuba está en el deber moral de aumentar su asignación a nuestra Asociación y por este medio hacemos un llamamiento cordial a su Comité Ejecutivo para que nos ayude más generosamente, sabiendo que esta ayuda redundará en más y mejores beneficios para ellos.

Antes de terminar deseamos expresar nuestro más profundo agradecimiento al compañero Presidente de Honor de la A.T.A.C. y Ex-Ministro de Agricultura de la Republica Sr. Fidel Barreto, a cuyos esfuerzos se debe la obtención de la franquicia postal para la Asociación mediante Decreto No. 2106 de fecha 4 de Junio de 1958.

También deseamos agradecer publicamente a la revista SUGAR Y AZUCAR el habernos dedicado el presente número de Octubre de dicha publicación y a la gerencia de este magnífico Hotel Habana Hilton por habernos brindado toda clase de facilidades para que nuestra 32ª Conferencia, que se inicia con este acto, tenga marco tan suntuoso y tan digno.

Muhas gracias.

La 32ª Conferencia Anual de la Asociación de

Técnicos Azucareros de Cuba

R. Ramos Grau

ESTE año la Asociación de Técnicos Azucareros de Cuba celebra su Conferencia Anual, la trigésimasegunda consecutiva, en los días 6 al 9 del mes de octubre. Es la primera vez en su historia que su reunión anual se lleva a efecto tan temprano en el año. Esto se debe a que existe la impresión entre una buena parte de los técnicos azucareros, de que mientras más se anticipa en el año la celebración de este evento técnico azucarero mayor será la concurrencia a él ya que se le estará dando la oportunidad al elemento del sector de la mecánica de la industria a participar del evento cosa que hasta ahora muy pocos podían atender debido a que en la época que normalmente se celebrada se hallaban atados al ingenio en trabajos de reparaciones pre-zafra.

La opinion va cundiendo y tomando cuerpo entre un numeroso grupo de técnicos azucareros de que el nombre de Asociación de Técnicos Azucareros de Cuba conlleva la idea de limitación del campo de acción de los problemas propios de la fabricación del azúcar de caña cuando lo cierto es que en ningún momento la A.T.A.C. ha restringido su acción técnica dentro de la industria azucarera: por el contrario, desde su primera Conferencia celebrada en 1927 comenzó a tratar en el seno de las mismas asuntos de tipo general que abarcan todos los sectores de la industria, incluyendo la posibilidad de la utilización de los productos secundarios de la caña de azúcar como fuente productora de nuevas industrias. Piensan los adeptos a esta idea que por lo tanto el nombre actual de la institución debe ser sustituído por el de Asociación de Técnicos Azucareros de la Caña de Azúcar. Se basan para ello en que es la Caña de Azúcar la materia prima única de la que se derivan las industrias del crudo, del refino, del papel del bagazo, la alcoholera, etc. Véase si no el caso de los técnicos internacionales cuya institución lleva el nombre de Sociedad Internacional de Técnicos de la Caña de Azúcar. A juzgar por la corriente de opinión favorable que existe en el sentido apuntado, es muy probable de que el asunto será llevado a la Junta General de Asociados de este año.

La celebración de la totalidad de los actos de la Conferencia serán efectuados este año en el novísimo y extraordinario Hotel Habana-Hilton, recientemente inaugurado. Las ventajas que ofrece este espléndido hotel aseguran el éxito de la Conferencia y máximo de comodidades y precios módicos a los delegados que se alojen en él.

Como en años anteriores, los Técnicos Azucareros visitarán alguna de las muchas industrias importantes que radican en las cercanías de La Habana, en cuya ocasión los Técnicos Azucareros suelen ser agasajados espléndidamente por sus anfitriones.

También, con toda seguridad, otro de los agasajos que recibirán será el de un cocktail party, que este año tendrá por sede el Sugar Bar de l'Hotel Hilton en su trigésimosegundo piso, el último del edificio. Desde aquí se disfruta de una espléndida vista aérea de la alegre ciudad de La Habana y sus contornos.

Los actos de apertura y de clausura, el primero en horas de la mañana y el segundo en horas de la noche, serán celebrados en el gran salón Pavillion, situado en el ala norte del último piso del hotel.

Las sesiones de trabajo en las que serán discutidos numerosos temas e sobre e agricultura, fabricación, ingeniería, productos secundarios y nutriología, se celebrarán en los días del 6 al 9 de octubre, de 9 de la mañana a 12 del día y de 2 a 6 de la tarde, a excepción del lunes 6 en la mañana que tendrá lugar la sesión de apertura y la tarde del miércoles 8 en que se hará la visita a la industria.

La Junta General se celebrará en la mañana del jueves 9. En este acto se discuten las conclusiones de los trabajos discutidos, se dá cuenta de las activades de las distintas comisiones de la Asociación entre ellas la de los Métodos Internacionales de Control de Laboratorio de la Sociedad Internacional de Técnicos de la Caña de Azúcar, la de los Métodos Uniformes de Análisis de Azúcar de la International Commission of Uniform Methods of Sugar Analysis, cuya duodécima reunión tuvo efecto el pasado mes de junio en la ciudad de Washington y el Comité de Proyectos e Investigaciones adjunto al Instituto Cubano de Investigaciones Tecnológicas. La finalidad de este Comité es la de estudiar, calorizar y promover cualquier idea, descubrimiento, invención, mejora o proyecto relacionado con la industria de la caña de azúcar, para ser sometidos, previo dictamen favorable de este Comité a la consideración de dicho Instituto para su auspicio y desarrollo. Este Comité es de reciente creación, habiendo quedado constituído el pasado mes de diciembre. Como punto final de este acto, se dá a conocer el resultado del escrutinio para la elección del Comité Ejecutivo que regirá los destinos de la Asociación durante el año que comienza el día 10 de octubre hasta la celebración de la próxima Conferencia Anual.

La Asociación tiene implantado el sistema de votación por correo, brindándosele así la oportunidad a todos los socios, protectores y de número, de ejercitar el derecho a elegir a sus dirigentes. El Comité de Postulaciones compuesto por el Comité Ejecutivo de la Asociación, sus ex presidentes, ex secretarios, ex tesoreros y sus fundadores confeccionan dos candidaturas de entre el cuadro de socios y las envía por correo a todos los socios que en la actualidad suman un total de 1.200.

En la noche del jueves 9, comenzando a las nueve, en el Pavillion, que como dejamos dicho más arriba, se halla situado en el piso tope del Hotel Habana-Hilton, tendrá lugar la clausura de la trigésimasegunda Conferencia Anual que celebra la Asociación de Técnicos Azucareros de Cuba sin interrupción. El objeto de este acto, de reciente creación, es el de hacerle entrega de los distintivos de oro y plata con sus correspondientes diplomas al Presidente de la Asociación y ex Secretario y ex Tesorero del año anterior y diplomas a los presidentes de Secciones y otros socios que se han hecho acreedores a los mismos por méritos contraídos.

La Asociación tiene instituidos distintos galardones con los cuales premia cada año a los socios que se han hecho acreedores a ello por sus méritos o también por su actuación íntegra o desinteresada en el desempeño de los diversos cargos a ellos encomendados; así como a aquellas personas que hayan prestado su concurso moral, material y/o personal al éxito de la Conferencia Anual de la Asociación. Entre los honores concedidos se hallan los "Distintivos de Oro y de Plata" y los Diplomas de "Honor", "Conmemorativo", al "Mérito", al "Mejor Trabajo" de la Conferencia en cada Sección, por "Servicios Distinguidos", "Especiales", de "Reconocimiento" y los Títulos de "Agradecimiento".

Este año recibirán los galardones anteriormente mencionados, los señores siguientes:

Presidente de Honor: Este año recibirá diploma acreditativo de su condición de Presidente de Honor de la A.T.A.C. por acuerdo de la Junta General de 1957, el distinguido compañero Walter E. Dickinson.

Socios Vitalicios Honorarios: La Junta General de 1957 acordó designar a todos los Socios Fundadores de la Asociación, socios vitalicios de la misma, con todos los derechos inherentes a los socios activos. En este caso se hallan: George W. Connon, actualmente residente en ciudad México; Walter E. Dickinson, retirado y residente en Cuba; Fernando Guerrero, residente en Cuba, Director Técnico de los ingenios de la firma Garía Díaz Ltda.; G. C. Kaar, actualmente retirado con residencia en San Diego, California y George W. Magalhaes, alto funcionario de la firma Westinghouse International, residente en New York.

Distintivo de Oro y Diploma de Honor: Francisco Santa María, Presidente, 1957.

Distintivo de Plata y Diploma de Honor: Pablo Lancella Sánchez, Tesorero, 1957. El Secretario no lo recibe este año por haber sido electo para un segundo período, que está desempeñando actualmente. Este es el señor Jorge C. Tarafa.

Diploma de Honor: Maximiliano Gonzáles, Coordinador General (Orderly Officer).

Agricultura: Presidente: Engelberto Bolaños.

Fabricación: Presidente: Lucio Rodríguez.

Ingeniería: Presidente: Ladislao Barreto.

Productos Secundarios: Presidente: Juan Romagosa.

Nutriología: Presidente: Tomás Durán Quevedo, Director del Boletín Oficial: Tomás Fandiño.

Diploma Conmemorativo: En conmemoración de sus veinticinco años consecutivos en activo en el seno de la Asociación:

Socios Protectores: Central Jaronú, Cía. Azucarera Atlántica del Golfo, Dorr-Oliver Inc., Marcelino García-Beltrán, Punta Alegre Sugar Sales Co.

Socios de Número: Juan M. Clark, Enrique F. Echenique, Manuel Estrada Pérez, Stewart Macfarlane, Cecil W. Murray, Jorge de Oña, I. J. Santamaría, Mariano Travieso Fundora, Ramón Villageliú.

Diploma al Mérito: Por la labor rendida durante quince años consecutivos en el seno de la Asociación:

Socios Protectores: Cía. Azucarera Elia, Cía. Azucarera Progreso, S. A., José Arechabala, S. A., Sucro-Blanc, Inc.

Socios de Número: Humberto Aguilar Díaz, Virgilio Alvarez Menéndez, Manuel Arias, Jr., Manuel F. Arias Arias, Roberto Bernal Cerice, Alberto Betancourt Castaño, Nicolás Betancourt Castaño, Alfredo Blanco Rosell, Joao Bravo Caldeira, José Luis Bustos, Francisco Cabrera Abreu, Andrés Calleja Rabassa, Ignacio Carvajal Olivares, Abdón Coello Garcés, Cía. Agrícola Cubitas, S. A., César B. Cueto Robayna, Rogelio Curbelo Hernández, Laurence H. Daniel, Bernardo Díaz de Arce, Miguel Dufau Zayas, Héctor R. Elizondo, René V. Escalona, Oscar A. Espinosa, Tomás Fandiño López, Fermín Fernández, Herminio Ferreras, Rolando Figueroa, Rigoberto Flores Pons, José Fuentes Allegue, Edgardo F. González Alonso, José D. González Verdeja, Roberto González-Rivera, A. J. Keller, Alberto Lancaster Jones, Marcelino Laserna, Arturo López Alcazar, Antonio Matos Sánchez, J. L. Matthews, Helio Morganti, Andrés Morales Hernández, José C. Ney, Faustino Ortíz Velaz, José Luis Otero, José M. Pascual, Juan Pedemonte, Cecilio de la Peña Valle, Tomás Pita de Hombre, Severo Quiñones Castañeda, Juan G. Real, José Luis Rodríguez Maribona, Ramón M. Rodríguez, Juan Romagosa Cruset, Alberto V. Roqué, Manuel Salinas Autré, Julio Sánchez G., Marco A. Sánchez, Francisco Santa María, Francisco Serna Silva, Miguel Solaún Grande, Antonio Sotolongo, Jorge C. Tarafa, Eugenio Tormes Gómez, Aquilino Torres, Plinio Torres Parapar y Alfred L. Webre, Jr.

Diploma al Mejor Trabajo: Un grupo de socios de la A.T.A.C., personales e instituciones, tienen instituídos premios en metálico y medallas de oro y la Asociación su correspondiente diploma al mejor trabajo presentado a la Conferencia Anual en cada una de las secciones:

Agricultura: (Premio "Ingenio La Joya"), trabajo titulado: "Resultados Obtenidos en los Estudios Comparativos de Variedades Realizados por la Estación Experimental de la Caña de Azúcar de Jovellanos en la Zafra de 1957". Autor: Roberto Barreto Domínguez.

Fabricación: (Premio "Diamante 72"), trabajo titulado: "Estudio de la Preclarificación del Guarapo en Medio Acido". Autor: José Ramón de la Vega. (Premio "Oleos, S.A."), trabajo titulado: "Ensayo sobre las Purezas de las Templas de Bajo Grado". Autor: Raúl Esparza Tabares.

Ingeniería: (Premio "Guillermo E. Ochoa"), trabajo titulado: "El Análisis

(Signe en la página 102)

Junta Directiva—Técnicos Azucareros de Cuba

Presidente: Guillermo E. Ochoa; socio desde 1945; tesorero de la Asociación en 1953; tercer vicepresidente y coordinador general de las Secciones de la ATAC en 1957; autor de numerosos trabajos publicados en las Memorias Anuales; técnico en electricidad industrial; agente de ventas de instrumentos industriales; fundador del premio que lleva su nombre en la Sección de Ingeniería.

Tercer Vicepresidente: Angel Ramón Ruiz; socio desde 1937; recipiente de diploma por servicios distinguidos en 1950; presidente de las Secciones de Ingeniería y Productos Secundarios en 1951 y 1954, respectivamente; vicetesorero en 1954 y tesorero en 1956; subdirector del "Boletín Oficial" en 1952; autor de numerosos trabajos publicados en las Memorias Anuales; ingeniero electricista; ingeniero consultor de la Cía. Thomas F. Turull.

Segundo Vicepresidente: Harry F. Pearson; socio desde 1953; ingeniero; jefe de maquinaria del Central Delicias.

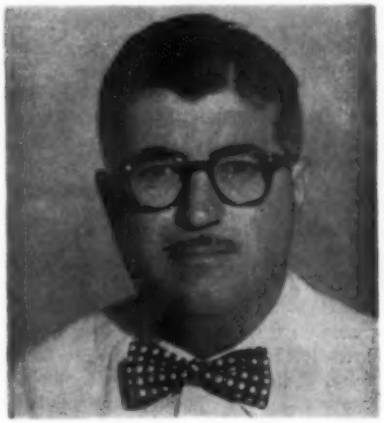
Primer Vicepresidente: Senén Viego; socio desde 1937; presidente de la Sección de Fabricación en 1945; vicesecretario en 1955; secretario y director del "Boletín Oficial" en 1955; tercer vicepresidente en 1957; autor de numerosos trabajos publicados en las Memorias Anuales y de diversas obras técnicas; maestro químico azucarero; superintendente de fabricación del Central Punta Alegre.

Secretario: Jorge C. Tarafa; socio desde 1944; ingeniero mecánico; vicetesorero en 1951 y tesorero en 1955; subdirector del "Boletín Oficial" en 1956; secretario en 1957; jefe de ventas de la Powe Machinery Company.

→

Vicesecretario: Tomás Fandiño López; socio desde 1944; vicepresidente de la Sección de Fabricación en 1955, presidente en 1956; director del "Boletín Oficial" en 1957; autor de numerosos trabajos publicados en las Memorias Anuales y en el "Boletín Oficial"; supervisor de fabricación del Central Violeta.

Secretario Letrado: Jorge Ramos Muñoz; abogado consultor del Ministerio de Trabajo de Cuba y de diversas instituciones nacionales. También ejerce la profesión de abogado libremente.



Tesorero: Issel L. Puig; socio desde 1947; técnico en electricidad industrial; autor de numerosos trabajos publicados en las Memorias Anuales y en el "Boletín Oficial"; colaborador de H. Woodside para ventas y servicio.

Vicetesorero: Joaquín Martínez Mestre; socio desde 1951; ingeniero químico del Departamento de Mercado de la Cía. Petrolera Shell de Cuba; autor de numerosos trabajos publicados en el "Boletín Oficial".

■

Biblioteca de los Técnicos Azucareros de Cuba

Esta biblioteca fue fundada en 1939 bajo el nombre de "Club Azucarero de Cuba" con fondos aportados por el Club, y se encuentra ahora radicada en las oficinas de la Asociación de Técnicos Azucareros de Cuba en la Calle 19 #9, Vedado, Habana, Cuba.

Sus objetivos son recoger la mayor cantidad posible de literatura azucarera, tanto nacional como extranjera. De momento cuenta con 2,500 volúmenes, incluyendo libros, revistas y folletos, adquiridos por compra, canje o donación.

La Biblioteca recibe más de 700 números de revistas y más de 100 libros y folletos al año. Tiene establecidos arreglos de canje con casi todas las instituciones similares del mundo. Entre sus posesiones encontramos la 3ª (1878) 4ª y 5ª ediciones de Alvaro Reynoso "Ensayo Sobre el Cultivo de la Caña de Azúcar". (Un detalle interesante de la 3ª edición es que está autografiada por el autor.) La Biblioteca incluye trabajos por autores como Pieter Honig, L. A. Tromp, Arthur Rosenfeld, Harold E. Box, Alfred L. Webre, Noel Deerr, Rafael Pedrosa, Senén Viego, Prinsen Geerlings, Spencer & Meade, y otros. Entre las revistas encontramos una colección completa de "Sugar" desde 1927; una colección completa del "International Sugar Journal" desde 1927; "El Mundo Azucarero"; "Socker" (Suecia); Memorias de los Técnicos Azucareros de Queensland, Australia, la India, África del Sur, Estados Unidos de Norteamérica, el Perú, Filipinas, etc. También incluye la mayoría de publicaciones oficiales y privadas publicadas en Cuba referentes a la industria azucarera; "Brasil Acuacreiro" y otras publiciones del Instituto do Azúcar e do Alcool do Brasil; una colección completa de los Congresos celebrados por la Sociedad Internacional de Tecnólogos Azucareros de Caña; los informes de los Hawaiian Sugar Planters desde 1909 hasta 1935, y otras importantes publicaciones de la Hawaiian Sugar Planters' Association; Sugar Abstracts (importantísima revista de resúmenes mensuales de cuanto se publica sobre el azúcar en sus diversas fases en la prensa universal, que es de especial utilidad para mantenerse al día); Manuales Azucareros de Cuba, Puerto Rico, Hawaii, etc.; Catálogos Azucareros, etc.

La Biblioteca mantiene numerosos contactos por correspondencia en Cuba y en el extranjero en su continuo esfuerzo por obtener información. También recibe llamadas telefónicas y visitas personales en sus oficinas, y todos sus servicios son absolutamente gratis. Su Director actual es el Ing. Segundo Pérez Alonso.

■

South Porto Rico Declara Dividendo

El 26 de agosto, la South Porto Rico Sugar Company declaró un dividendo trimestral de 25 centavos por acción pagadero a los accionistas el 15 de septiembre. Esto representa una reducción del dividende de 50 centavos por acción pagado el trimestre anterior. Se recordará que este empresa declaró un dividendo de 10% sobre sus acciones el 30 de septiembre.

Un rincón de la extensa biblioteca en las oficinas de la Asociación de Técnicos Azucareros de Cuba. Aquí, de izquierda a derecha, Guillermo Ochoa, Senén Viego, Issel Puig y José Ramón de la Vega de la Asociación estudian varias adquisiciones recientes.

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Adelantos en la Agricultura de la Caña en Cuba y en el Control del Borer.

Por L. C. Scaramuzza, F.R.E.S.,
Entomólogo de la Compañía Azucarera Atlántica del Golfo

RESULTA algo difícil hablar de los adelantos de la agricultura de la caña en Cuba sin subordinarlos a los vaivenes del mercado mundial y de la zafra o cosecha de caña de Cuba a los que están irremediablemente ligados. Es este un problema bastante complejo y para que los lectores de otros paises puedan comprenderlo mejor, vamos a tener que bosquejar ciertos aspectos fundamentales de la agricultura básica de la caña.

Es bien sabido que comercialmente la caña se siembra por medio de trozos provistos de varios ojos o yemas, los que al germinar darán origen a las plantas de caña, pero hay que saber que las cañas de estas siembras nuevas no se podrán cortar para moler hasta transcurridos de 16 meses, como mínimo, hasta 20 ó 24 meses. Los campos continuan produciendo cosechas sucesivas durante varios años, desde cinco hasta 15 y aun 20 en muchos lugares de Cuba, lo que se conoce con el nombre de retoños y se cortan a los 11 ó 12 meses, pero como siempre hay campos viejos que reponer para mantener la producción de la Colonia o Finca cañera, casi todos los años hay que efectuar algunas siembras nuevas.

Conviene advertir sin embargo, que como el azucar es el producto en que está basada la economía nacional de Cuba, ya que Cuba continua siendo el primer pais productor de azucar del mundo, con el objeto de evitar hasta donde sea posible la baja de su precio en el mercado mundial a niveles ruinosos, la producción de cada año es regulada cuidadosamente por el gobierno, con el asesoramiento de la Asociación de Hacendados o dueños de ingenios y de la Asociación de Colonos, o plantadores de caña, con cuya representación se constituye el Instituto Cubano de Estabilización del Azucar, organismo que regula el monto de la zafra y la cantidad de azucar que puede producir cada ingenio y por consiguiente cada ingenio conoce que cantidad de caña necesitará moler para producirla. Todo está minuicosamente regulado para evitar manejos doloros o competencia ilícita y cada ingenio cuenta con su zona de caña, de la cual no es posible sacar caña para otro ingenio como no sea mediante la intervención del citado Instituto, con la debida tramitación y de mutuo acuerdo.

L. C. Scaramuzza

Mucho se ha adelantado en Cuba en la agricultura de la caña durante los últimos años y ya las románticas yuntas de bueyes uncidas al arado o a otros implementos agrícolas para el cultivo de la caña, son cosas del pasado, pues en todas partes se advierte la presencia de los "bulldozers", tractores, motoniveladoras, "land-planers" y otros equipos para la preparación moderna, cientifica y eficiente de las tierras que se están destinando al cultivo de la caña de azucar.

Tambien se ha progresado mucho en los métodos de transporte empleados para conducir al ingenio la caña cosechada, y aqui si es verdad que la clásica carreta de bueyes con su pintoresco carretero es una estampa del pasado que raramente puede verse hoy en dia, pues la abundancia de buenos caminos y carreteras está restringiendo su uso cada y vez mas, al prohibirse su tránsito por esos caminos si no están provistas de ruedas de goma, cediéndole el lugar a los comiones y tractores que rápidamente conducen trenes de carretas

Soltando moscas Lixophaga *en un campo de caña, para el control biológico del borer, en la provincia de Matanzas, Cuba.*

Vista del interior de un laboratorio para la producción de moscas Lixophaga, *en la provincia de Matanzas, Cuba.*

modernas desde los campos donde se cosecha la caña hasta el ingenio que la transformará en azucar, mas o menos blanco, pero siempre dulce.

El adelanto técnico de refleja también en los métodos modernos de cultivo que actualmente se emplean, evidenciado por un notable aumento en el consumo de abonos químicos así como un gran incremento del arae bajo regadio, con el consiguiente aumento de la cantidad y calidad de los equipos de bombeo. Pero a este respecto es también necesaria una aclaración muy importante: las tierras de Cuba dedicadas al cultivo de la caña de azucar son en su mayoria tierras fecraces de alta productividad; donde no existen sistemas de regadio, esta productividad queda a expensas de la naturaleza y aunque Cuba goza de un clima ideal para el cultivo de la caña, con abundantes lluvias y calor durante los meses de crecimiento, y temperaturas mas templadas y hasta casi frias, sin lluvias, en los meses de la manurez y cosecha, las lluvias no siempre caen cuando mas falta hacen.

Pero donde existe un sistema de regadio con tierras productivas, como generalmente ocurre, el empleo del riego y de los abonos queda subordinado a las perspectivas de la próxima zafra. Para aclarar mejor esto es necesario explicar que cuando el gobierno restringe la cantidad de azucar que debe producirse, como acaba de ocurrir en la zafra de este año, entonces quedan sobrantes de caña en todas las regiones productoras, ya que la producción es cuidadosamente prorrateada y consecuentemente ese año se restringen las siembras; se reduce la aplicación de fertilizantes y los equipos de regadio solo se usan en casos de extrema necesidad.

En este importante aspecto de la agricultura de la caña, podemos decir que han habido muy pocos cambios en los últimos diez años, ya que la variedad mas extensamente cultivada en la Isla, continua siendo la POJ 2878, si bien es cierto que también se cultivan comercialmente las variedades: POJ 2714; POJ 2727; POJ 2883; POJ 2961; POJ 3016; Pepe Cuca; Media Luna 3-18, y en ciertas tierras pobres, las Co. 281 y Co. 290. Las cañas de Barbados, tales como las B. 34104 y la B. 37161 han sido sembradas con cautela debido a la alta susceptibilidad al Mosaico de la B. 34104, y esto pudiera haber influido en que no se hayan extendido mas las siembras de estas variedades que ahora ofrecen una serie de variedades que han adquirido mucha fama en diversos lugares.

A este respecto no podemos dejar de mencionar la labor realizada por la Estación Experimental de la Caña de Azucar del Ministerio de Agricultura, que en los últimos años ha producido algunas variedades muy prometedoras, tales como las Cuba 693-47; C. 529-50 y otras mas que en varios experimentos comparativos realizados en diversos Centrales han demostrado ser muy superiores a la POJ 2878, que puede considerarse la caña "standard" de Cuba; sin embargo tanto los Hacendados como los Colonos demuestran ser tal vez, demasiado conservadores en ese sentido y al parecer serán necesarios varios años mas y un mayor número de experimentos para que se decidan a efectuar siembras extensivas de estas nuevas variedades.

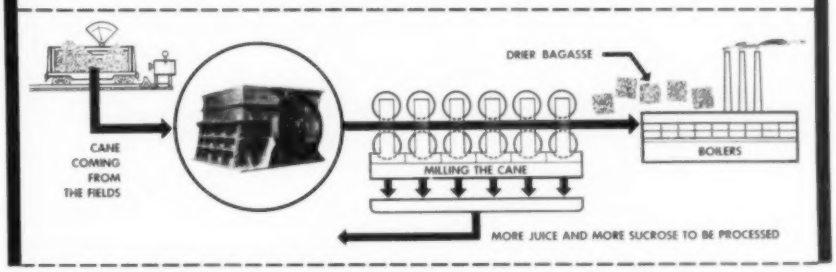
Esta resistencia, despues de todo, está muy bien justificada si se considera que las variedades actualmente en uso son capaces de producir retoños que están rindiendo cosechas remuneradoras hasta despues de 15 y 20 años y no puede saberse si esto tambien puede esperarse de las nuevas variedades.

Cuba tiene la suerte de estar libre de las principales enfermedades graves de la caña de azucar, ya que con excepción del Mosaico, que carece en absoluto de importancia pues no se están sembrando variedades susceptibles al mismo, y del Raquitismo de los Retoños, enfermedad que ha sido reportada de algunos lugares en años recientes, pero respecto a la cual hay muy pocos datos, este país ha logrado mantenerse libre de las más enfermedades

(Signe en la página 96)

DATOS QUE USTED DEBE CONOCER ACERCA DEL PROCESO GRUENDLER DE PREPARAR LA CAÑA

HE AQUI COMO EL PROCESO GRUENDLER SE AGREGA A SU DIAGRAMA FUNCIONAL



Gastos de conservación insignificantes, como lo demuestra el siguiente informe de uno de los ingenios más importantes del mundo: "Los pasadores de los martillos de la Desfibradora Gruendler fueron cambiados al cabo de desfibrar 5,256,413 toneladas de caña. Los martillos fueron rectificados por primera vez al cabo de desfibrar 1,485,316 toneladas de caña." Estos resultados óptimos pudieron lograse solamente con equipo hecho de los mejores materiales, más años de experiencia y perfecta mano de obra.

Aumento en el ritmo de molienda, lo que acorta el período de molienda a tal grado que el costo por tonelada de caña molida se reduce considerablemente.

Entre otros factores económicos y lucrativos tenemos que el Proceso Gruendler aumenta la extracción de sacarosa considerablemente y produce bagazo que arde mejor.

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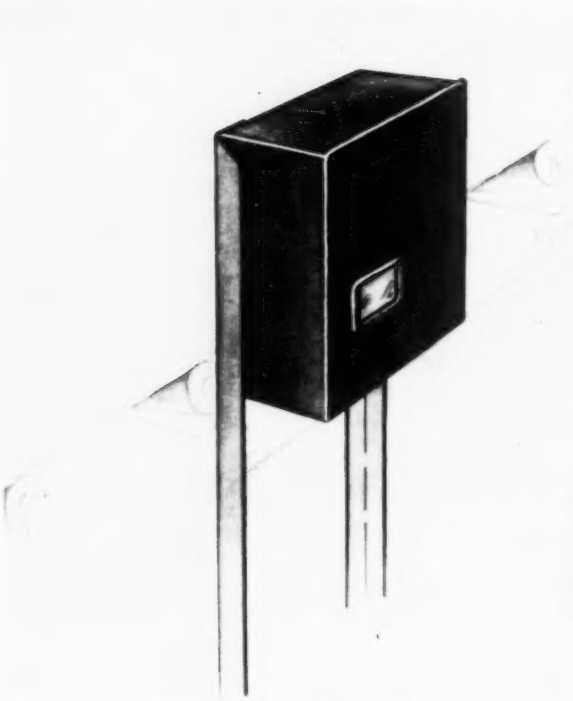

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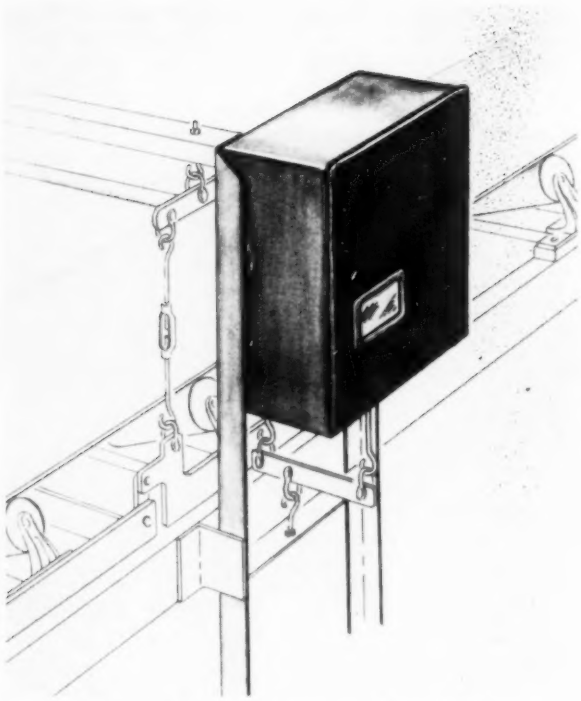


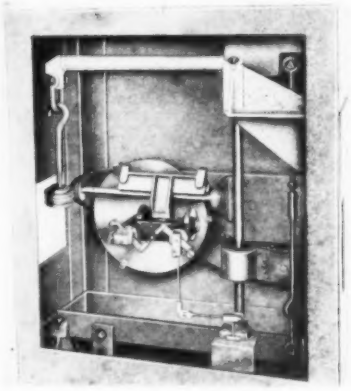
El WEIGHTOMETER S-V de Norma se adapta fácilmente a la mayoría de locales por donde pasa el transportador, y donde la altura de paso es un problema de menor importancia.

Ahora . . . un WEIGHTOMETER® compacto de balo precio para pesar bagazo, azúcar a granel o cosetas continuamente

El nuevo WEIGHTOMER S-V Merrick le ofrece las ventajas de poder pesar y totalizar en el transportador continuamente en un aparato de precio módico diseñado para poderlo adaptar a cualquier sistema de conducción indistintamente de la altura de paso. Los WEIGHTOMETERS, extensamente en uso en la industria de azúcar de remolacha para pesar y regular las cosetas continuamente, se están usando ahora para "regular la cantidad" de bagazo y de azúcar crudo en fábricas de azúcar de caña.

EL WEIGHTOMETER es capaz de algo más que mantener un registro exacto y continuo del peso que pasa sobre el transportador. En combinación con otros medios de regulación afines, es capaz de "automatizar" completamente muchas operaciones relacionadas en su proceso de elaboración.

Para más información sobre el nuevo S-V y otros modelos del WEIGHTOMETER, escríbanos hoy mismo.



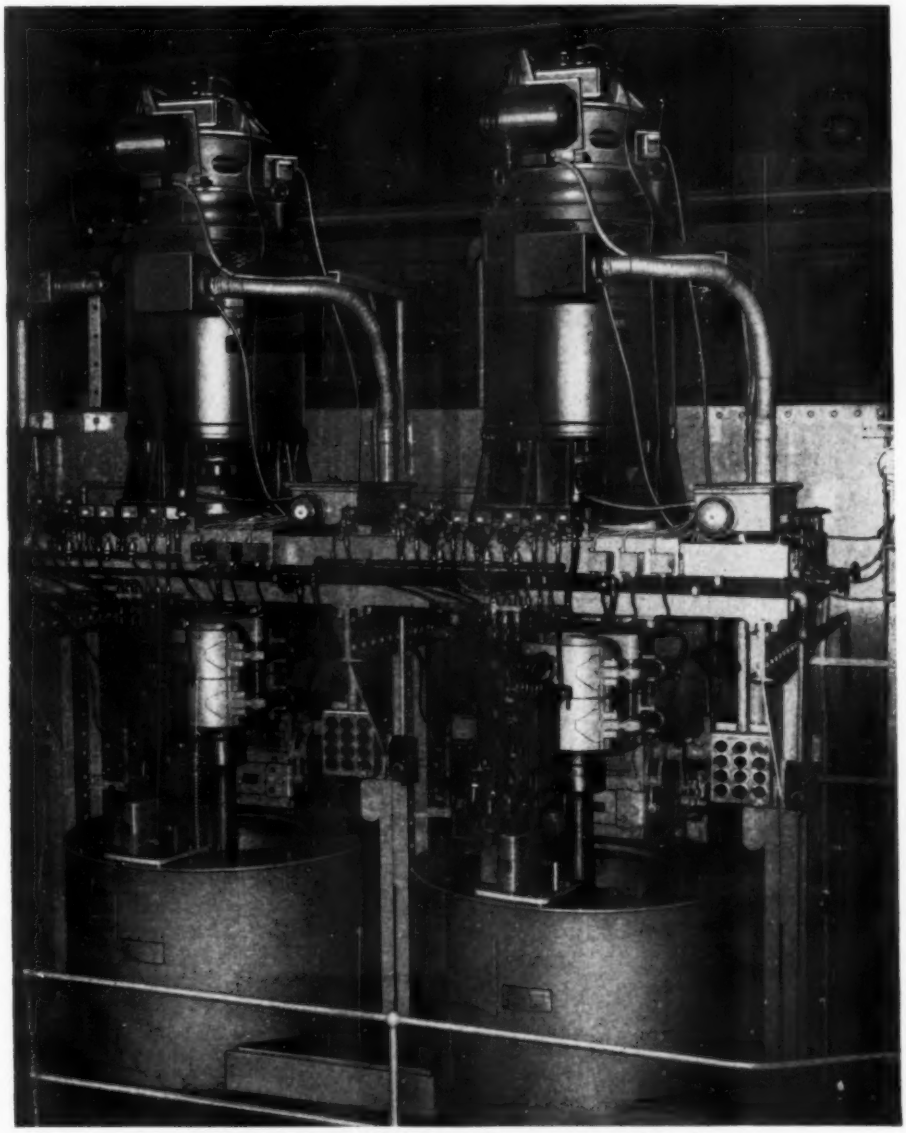
El interior del WEIGHTOMETER S-V muestra su sistema integrador y totalizador.

MERRICK *50 años de "primeras" en pesadas automáticas*

MERRICK SCALE MANUFACTURING COMPANY
184 AUTUMN STREET, PASSAIC, N. J., E. U. A.

2433

LAS G-8 EN JARONU
LAS PRIMERAS EN CUBA



Fotografía de la instalación de dos centrífugas automáticas Western States, 48" x 30" 1200 RPM, produciendo azucar cruda en el Central Jaronu.

La primera instalación de centrífugas G-8 en Cuba de 48" y completamente automáticas empezó a funcionar en el Central Jaronu. Provincia de Camaguey, en la zafra de 1956. Estas centrífugas funcionan en un ciclo completo, de carga a carga, de 155 segundos (23 cargas cada maquina por hora). Inmediatemente despues de descargar, el proximo ciclo comienza automáticamente. Los canastos se llenan de igual cantidad de azucar o sea un promedio de 16.8 pies cúbicos cada carga.

Esté Ud. seguro que sus nuevas centrífugas funcionen en la misma forma. Investigue Ud. e instale la centrífuga G-8 de Western States.

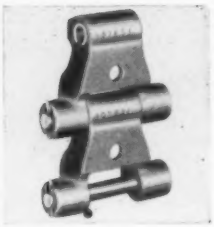
ROBERTS STEVENS
The
WESTERN STATES
MACHINE COMPANY
HAMILTON, OHIO, U.S.A.

Webster

SISTEMAS Y PIEZAS PARA EL MANEJO DE MATERIALES EN CENTRALES AZUCAREROS

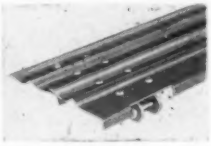
WEBSTER es un fabricante íntegro de sistemas de conducción de la más alta calidad—sistemas que han dado excelentes resultados en el manejo de caña de azúcar en sus diversos estados de elaboración. Nuestro servicio comienza con un estudio y un diseño preliminares del equipo necesario, y puede terminar con la fabricación, montaje y prueba satisfactoria de su funcionamiento.
Los ingenieros de WEBSTER han contribuído notablemente a la evolución de sistemas para el manejo de bagazo y azúcar a granel que reducen los costos de producción. Nos será grato discutir la aplicación de estas mejoras a sus necesidades especiales. Escríbanos hoy mismo.

WEBSTER MANUFACTURING, INC.
Depto. S-28, Tiffin, Ohio, E.U.A.
Oficinas Exportación
90 West St., New York 16, N.Y., E.U.A.
Oficinas de Ventas y Distribuidores en todas las principales ciudades
OFICINAS DE VENTAS EN PUERTO RICO, DOMINICAN REPUBLIC, VIRGIN ISLANDS Y HAITI—
ABARCA WAREHOUSES CORP., San Juan, Puerto Rico
OFICINAS DE VENTAS EN CUBA—
W. M. ANDERSON TRADING CO., S. A., Habana



Cadena

Aditamentos



Tablillas

Ruedas Dentadas

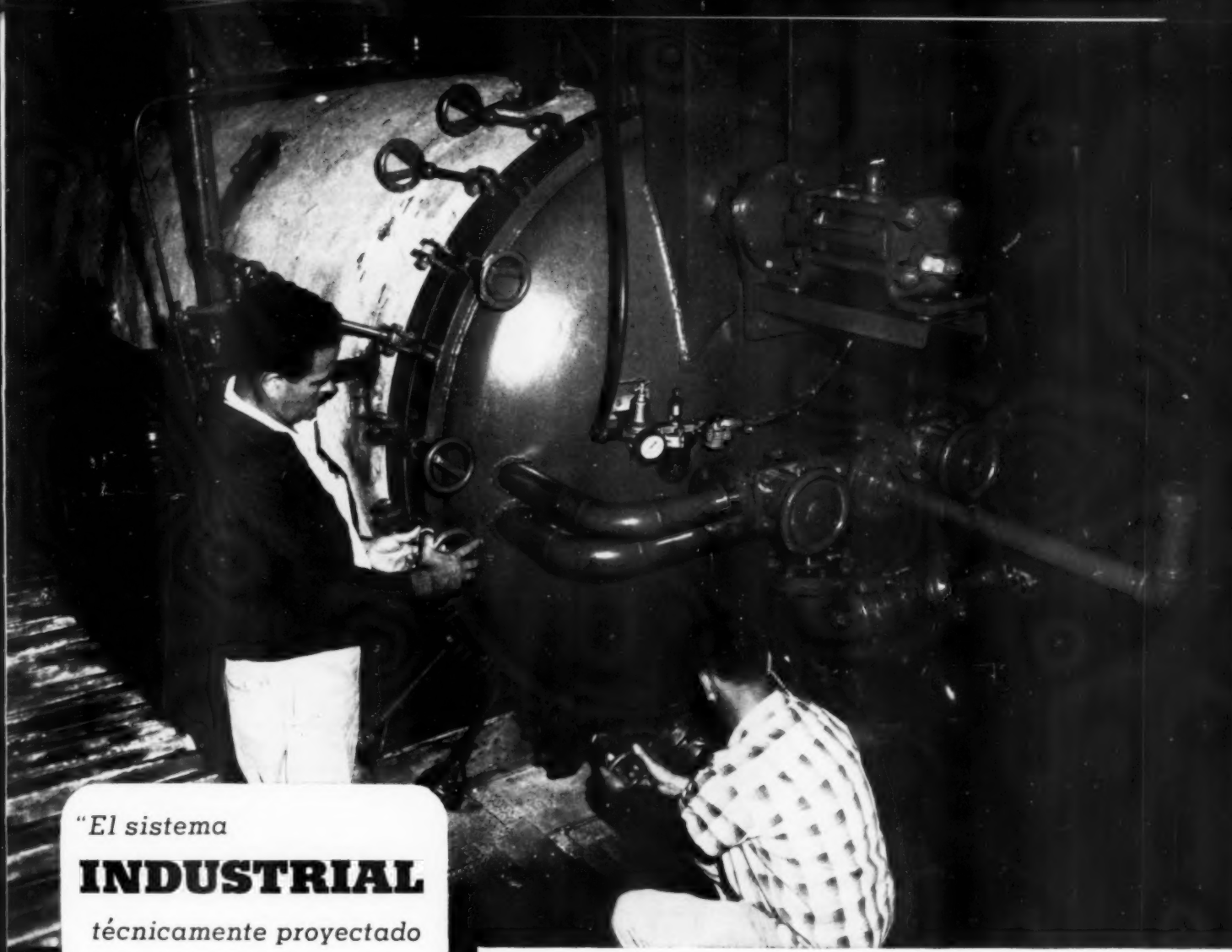
Respaldada Por 82 AÑOS DE EXPERIENCIA

Tanto si usted está comprando CADENAS, RUEDAS, DENTADAS o TABLILLAS para repuesto, como un sistema para el manejo de materiales completamente nuevo, usted puede estar seguro de que el diseño, mano de obra y materiales WEBSTER le proporcionarán lo máximo en funcionamiento eficaz y largo servicio, seguro y económico.

WEBSTER fabrica un renglón completo de equipo de conducción, incluyendo—

MESAS DE ALIMENTACIÓN DE CAÑA
TRANSPORTADORES DE CAÑA
TRANSPORTADORES INTERMEDIOS
COLADORES DE JUGO
TRANSPORTADORES DE BAGAZO
TRANSPORTADORES DE BANDA
ELEVADORES DE CUBOS
TRANSPORTADORES EN ESPIRAL
TRANSPORTADORES DE CINTA
TOLVAS & COMPUERTAS
LANZADORES DE AZÚCAR
ARRUMADORES PARA BUQUES

ELEVATING AND CONVEYING MACHINERY · SINCE 1876 ·



"El sistema

INDUSTRIAL

técnicamente proyectado ha demostrado su capacidad de aumentar la producción con menos costos de operación"

. . . dice el gerente de una fábrica de azúcar en Fellsmere, Florida.

COMPARE ESTOS RESULTADOS:

(Rendimiento en galones de miel de 63° Brix por pie² de área filtrante)

SEMANA	FILTRO INDUSTRIAL DE TIPO ESPECIAL	FILTRO CONVENCIONAL DE TIPO CORRIENTE
A	42	14.5
B	35	8.5
C	29	12.0
D	22	7.5
E	16	5.0
F	20	13.0
G	31	7.8
PROMEDIO	28	9.8

INDUSTRIAL

La ilustración muestra un filtro de tipo especial diseñado por la INDUSTRIAL para cierto trabajo en cierta planta, o sea para la filtración de licores tratados por el proceso de Sucro-Blanc en Fellsmere, Florida.

Este filtro INDUSTRIAL de tipo especial fue puesto en servicio al lado de un filtro de placas convencional de tipo corriente, con igual área filtrante, y empleado para el mismo trabajo.

Los resultados auténticos anotados en la tabla a la izquierda eliminan toda duda en cuanto a la extraordinaria eficiencia del filtro INDUSTRIAL especial. También conviene observar que durante el período de prueba, la caña fue afectado por las heladas cuatro veces por lo menos, cuyos jugos resultaron ser sumamente difíciles de manejar.

¿A qué se debe esta asombrsa diferencia? La respuesta yace, desde luego, en el esmerado diseño y su aplicación al equipo, lo que aseguró buen funcionamienti hidráulico, y limpiezas rápidas eficaces y perfectas ciclo tras ciclo. En este caso, el filtro INDUSTRIAL produjo TRES VECES el rendimiento del filtro convencional de igual tamaño. A la inversa, esto significa que la frecuencia de las precapas fue reducida a un tercio, lo que redujo considerablemente los costos de auxiliar filtrante y de trabajo.

Diríjase a la INDUSTRIAL *para que le demuestre cómo los sistemas técnicamente diseñadps pueden resolver sus problemas de filtración.*

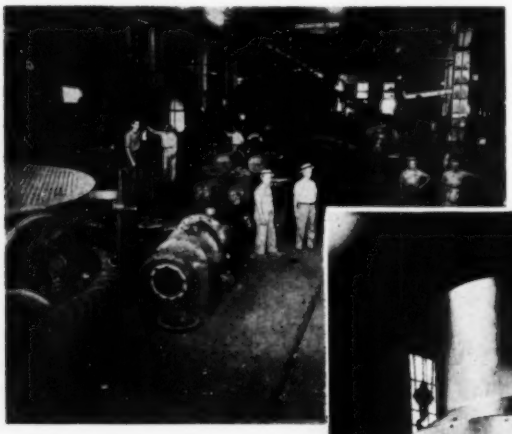
INDUSTRIAL FILTER & PUMP MFG. CO.
5928 Ogden Avenue, Cicero 50, Illinois, E.U.A.

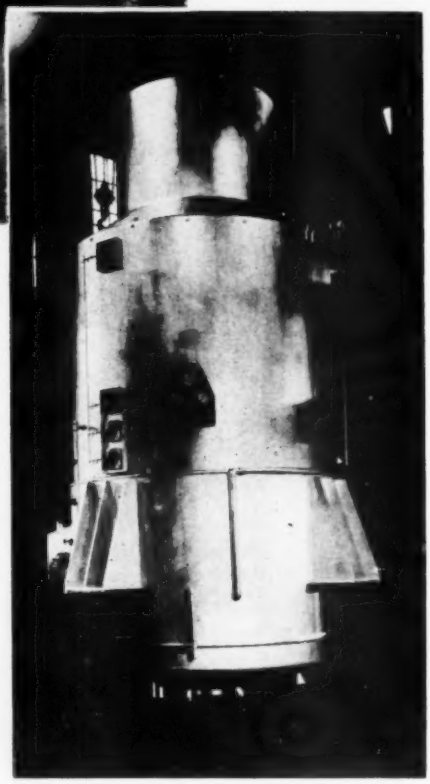
Filtros a Presión • Equipo de Intercambio Iónico •
Equipo para el Tratamiento de Residuos

S-258SP

SIRVIENDO A LA INDUSTRIA AZUCARERA CUBANA

Más de la mitad de los centrales azucareros en Cuba cuentan con maquinaria construída por la Fundición Macfarlane.





Durante los últimos cuarenta años la Macfarlane viene prestando especial atención a mazas y ejes de molino, a fin de asegurar que los metales que entran en su construcción sean de la más alta calidad, propios para servicio pesado y larga duración. Sírvanse enviarnos planos o especificaciones a fin de poder preparar ofertas y presupuestos de acuerdo con sus necesidades.

Frecuentemente la Macfarlane recibe mazas de molinos de muchos países de América del Sur así como de la Florida para su rectificación. En nuestros talleres se han construído gran número de calentadores de jugo, evaporadores y tachos al vacío sumamente eficientes. Somos concesionarios para los Tachos al Vacío Hamill de Poca Altura.

Muchas fábricas de azúcar en América Central y otras regiones han aprovechado la ventaja del eficiente diseño y experta mano de obra incorporados en la maquinaria construída por la Fundición Macfarlane.

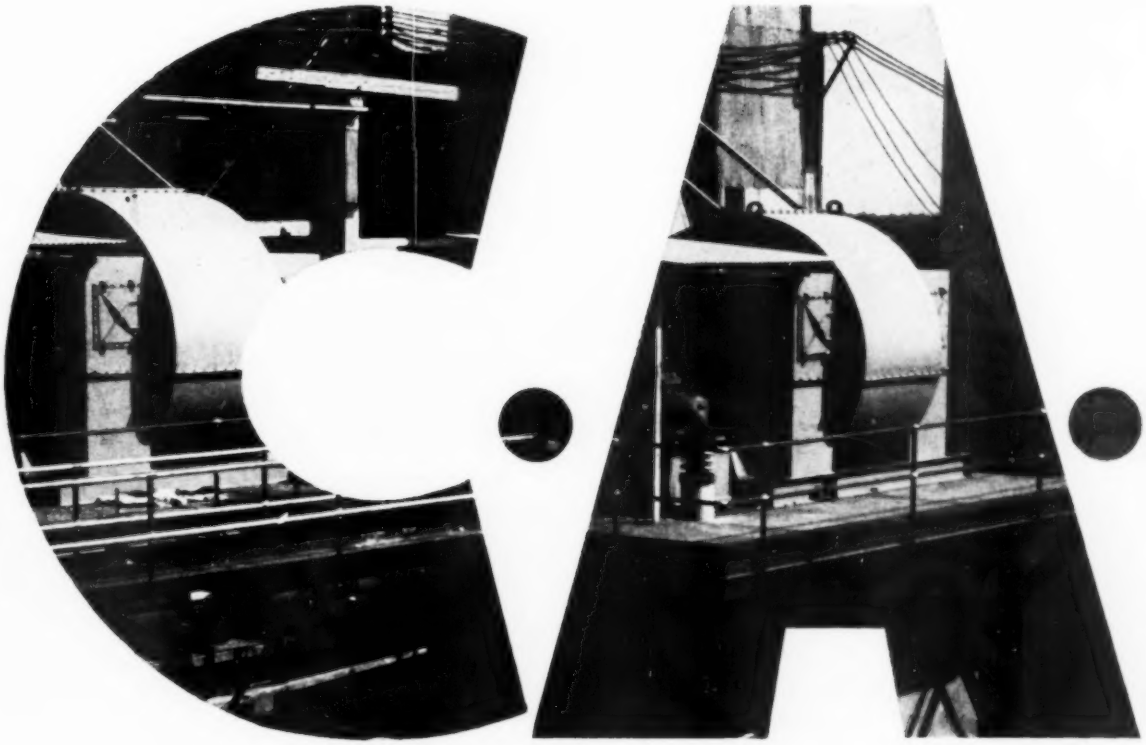
FUNDICION MACFARLANE S. A.

Apartado 43
Sagua la Grande
Las Villas, Cuba

Teléfono: 496 - 292
Cables: MACFARLANE

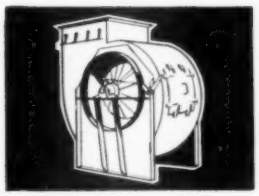
Apartado 109
Edificio Bacardí 617
Habana, Cuba

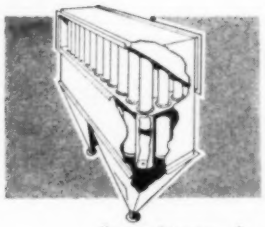
Teléfono: 6-3332 - 5-2930 - 5-2939
Cables: BABCOCK
HABANA, CUBA

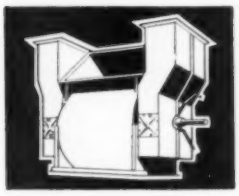


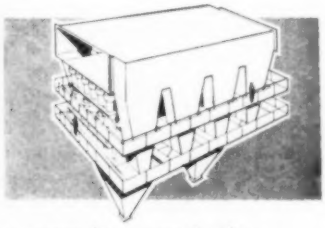
WHIRLEX REALIZA LA EXTRACCION TOTAL DEL RESCALDO DE BAGAZO EN EL CENTRAL AGUIRRE

El *magnífico servicio* del equipo WHIRLEX durante varias campañas en cuatro calderas en el Central Aguirre, Puerto Rico, culminó en *otro pedido* de un sistema WHIRLEX completo de ventiladores, colectores y equipo de reinyección para su neuvo generador de vapor de 125,000 libras. La nueva caldera con su equipo WHIRLEX se piensa poner en servicio para la campaña de 1958.









Para sistemas de extracción de polvo completamente integrados y coordinados, tenemos disponible el siguiente equipo armado en nuestros talleres:

Colectores de Gas Mecanocentrífugos Tipo WHIRLEX CTF • Colectores Multiciclónicos Tipo WHIRLEX MTSA 9CYT • Ventiladores WHIRLEX de Tiro Inducido • Ventiladores WHIRLEX de Tiro Forzado • Ventiladores Eductores WHIRLEX Industriales • Conductos Especiales • Chimeneas Autoestables • Reguladores de Tiro • Estructuras de Soporte

Solicite hoy mismo datos técnicos completos

FLY ASH WHIRLEX ARRESTOR

THE FLY ASH ARRESTOR CORPORATION

267 North First Street Birmingham, Alabama, E. U. A.

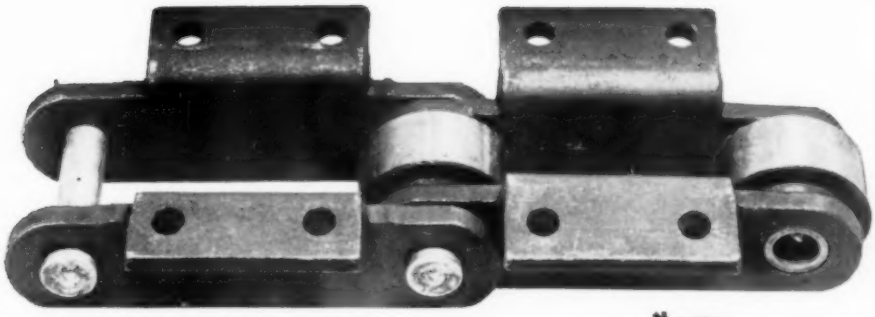
4 PUNTOS QUE TENER EN MENTE!

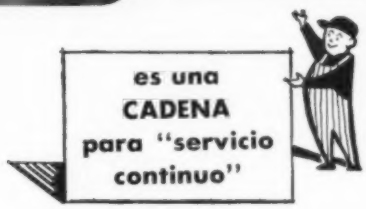
- Norit consejo práctico donde quiera y cuando quiera que se necesite
- Norit representantes en todos los países para acelerar los embarques
- Norit calidades propias para toda condición local
- Norit carbones activados siempre a precios de competencia

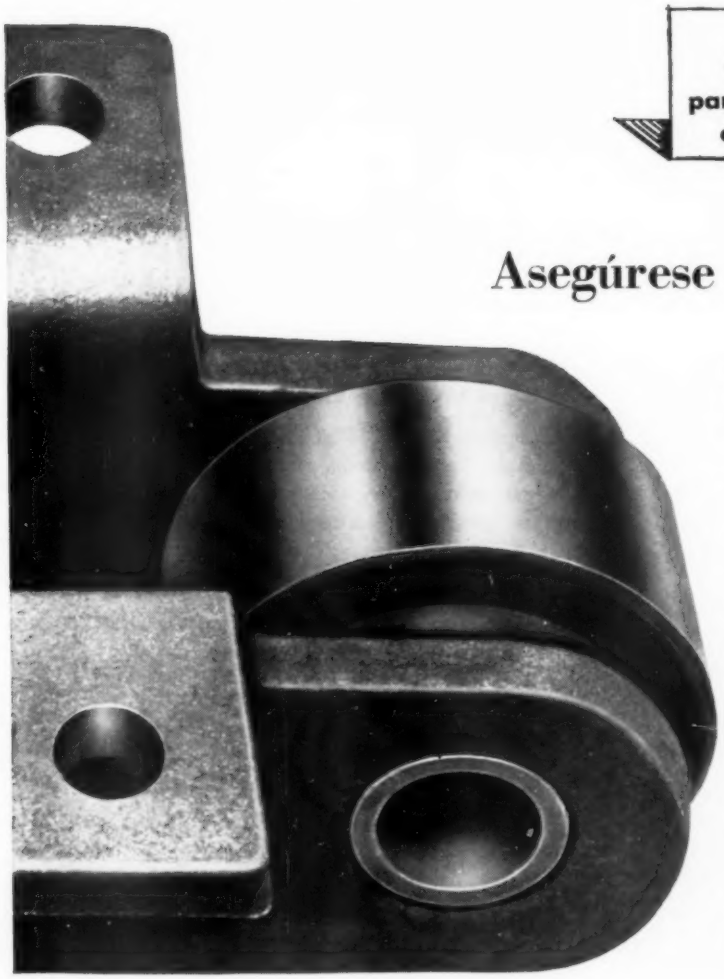
NORIT

NO-4-26

UNITED NORIT SALES CORPORATION LTD. AMSTERDAM - HOLLAND







Asegúrese con REX

No hay mejor seguro contra el "tiempo muerto" en su transportador de caña que una cadena Rex A2800-K22. Su resistencia—combinada con las excelentes características Rex—hace que esta cadena de 8 pulgs. de paso sea la mejor para el servicio más pesado en grandes ingenios.

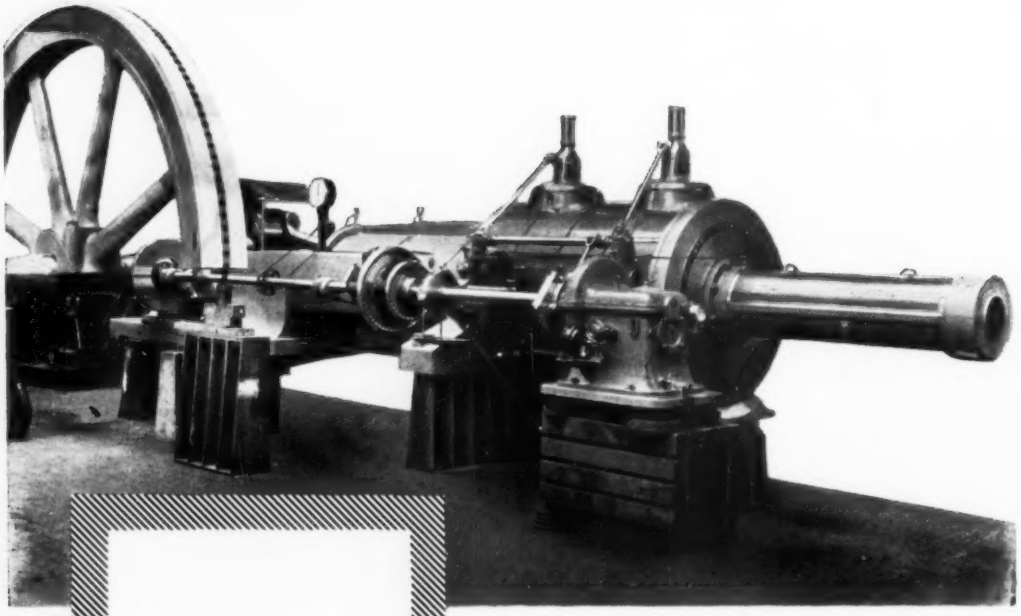
La Rex A2800-K22 es una cadena para "servicio continuo". La alta calidad de su diseño, de sus materiales y de su construcción aseguran su perfecto funcionamiento hasta el último día de la campaña de molienda.

La línea Rex de cadenas para transportadores de caña también incluye tamaños más pequeños para servicios livianos. La mayoría de estas cadenas—incluso la A2800-K22—se pueden proveer de engrasadores a presión en los pasadores.

Para lo mejor en toda clase de cadenas para ingenios—ruedas dentadas—tablillas—poleas locas, comuníquese con el distribuidor de Chain Belt en su comarca, o solicite el Boletín 52-71.

Oficinas de Exportación: Milwaukee 1, Wis., y 19 Rector St.
Nueva York, 6, N.Y., EE. UU.
Dirección Cablegráfica: "BELTCHAIN".

CHAIN BELT COMPANY



Esta máquina Stork-Werkspoor a vapor siempre será la fuerza motriz más barata para los molinos de caña en su fábrica

La molienda continua requiere absoluta confianza en la planta motriz.

Las máquinas STORK-WERKSPOOR con válvulas de charnela ofrecen esta seguridad, así como: velocidad regulada por el regulador de presión de aceite patentado — ajuste de velocidad entre amplios límites — bajo consumo de vapor, a cargas también reducidas — reversión directa — economías por los bajos costos de conservación.

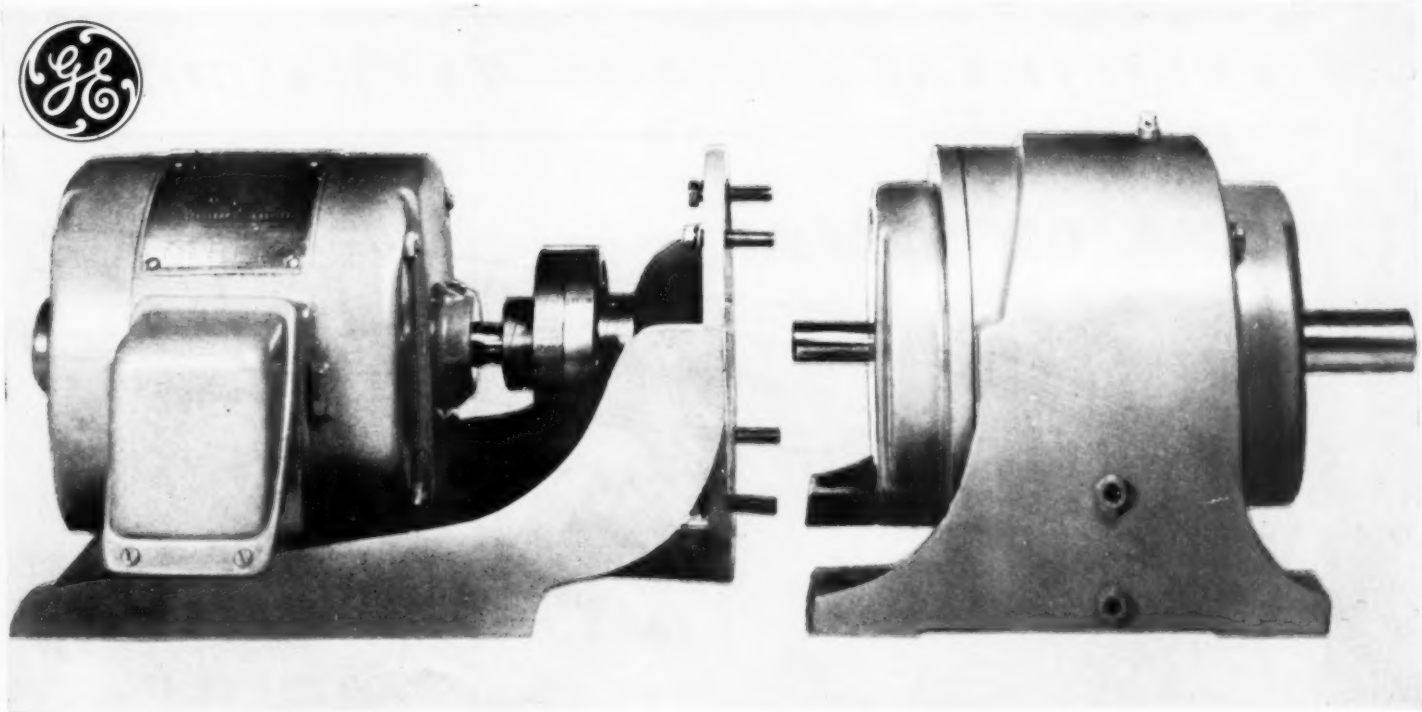
También se ofrecen con armazones cerradas para altas velocidades.

Permita que la STORK-WERKSPOOR le construya su fábrica de azúcar completa.

Las ventajas son evidentes:
La armonía en construcción y conformidad de diseño dan por resultado un proceso fabril bien equilibrado y aseguran eficiencia, confianza y economía.

STORK HENGELO — VERENIGDE MACHINEFABRIEKEN V·M·F NEDERLAND STORK·WERKSPOOR — **WERKSPOOR** AMSTERDAM

PARA MAQUINARIA AZUCARERA EN GENERAL DIRIJASE A GEBR. STORK & CO. N.V., HENGELO, HOLANDA



Nueva serie de unidades de motores y engranajes General Electric para cualquier aplicación industrial que exija baja velocidad.

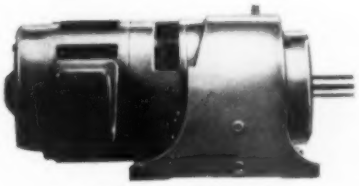
EL NUEVO DISEÑO OFRECE IMPORTANTES AHORROS

La General Electric lanza al mercado una nueva serie de unidades de motores y engranajes reductores de velocidad, proyectados y desarrollados para satisfacer las necesidades de la industria moderna. La nueva serie, que consta de 3 tipos de unidades, se basa en una transmisión de extraordinaria sencillez, que utiliza engranaje helicoidal. El nuevo tipo de construcción ofrece 3 importantes ventajas para accionamiento de máquinas a baja velocidad.

1. **Mayor seguridad de funcionamiento** - Todas las unidades se fabrican de acuerdo con los métodos más modernos de fabricación de engranajes y se prueban antes de salir de fábrica.

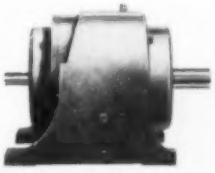
2. **Facilidad de mantenimiento** - La alineación de cada unidad se realiza con máquinas de precisión, lo que facilita el montaje y desmontaje. Las piezas de repuesto del engranaje pueden tenerse en stock en forma de conjuntos parciales montados, lo que permite reducir el tiempo de las paradas debidas a reparaciones normales.

3. **Menor inversión en piezas de repuesto** - La standardización y la intercambiabilidad de las piezas permite reducir el capital invertido en piezas de repuesto, sin menoscabo de la continuidad de servicio.



NUEVA Unidad Integral
Unidad compacta de acoplamiento integral, con motor fácilmente desmontable y alineación de precisión.

NUEVA Unidad para Toda Clase de Motores
Proporciona amplia adaptabilidad para múltiples aplicaciones. Permite efectuar el cambio del motor sin interferir con el engranaje.



NUEVA Unidad Reductora Independiente
Permite obtener una amplia variedad de velocidades de salida con transmisión por cadena o por correa.

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Nuestros Productos son Indice de Progreso

GENERAL ELECTRIC
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VEA HOY MISMO ESTA NUEVA SERIE EN:

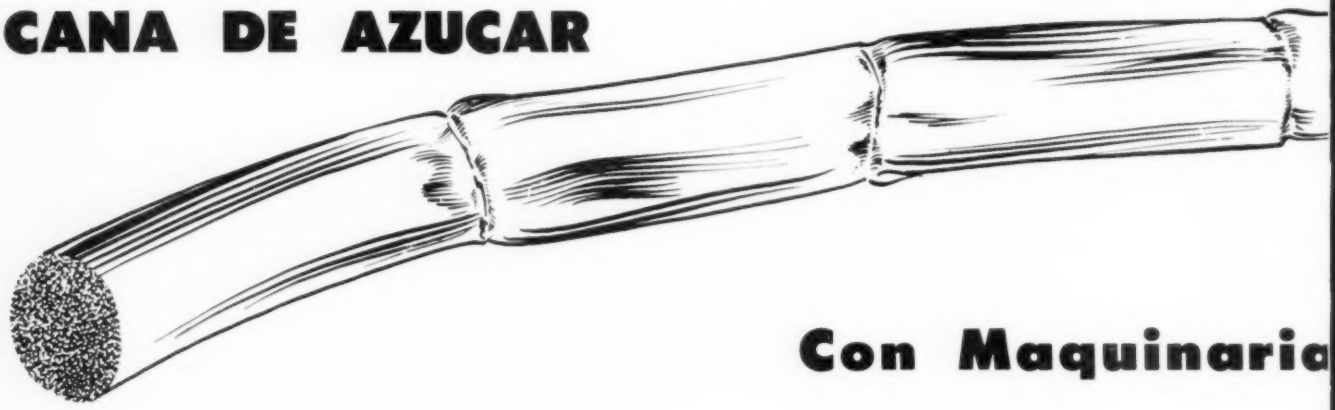
GENERAL ELECTRIC CUBANA, S. A.

Edificio General Electric, Paseo de Martí (Prado) y Animas, La Habana. Estrada Palma 556, Santiago de Cuba

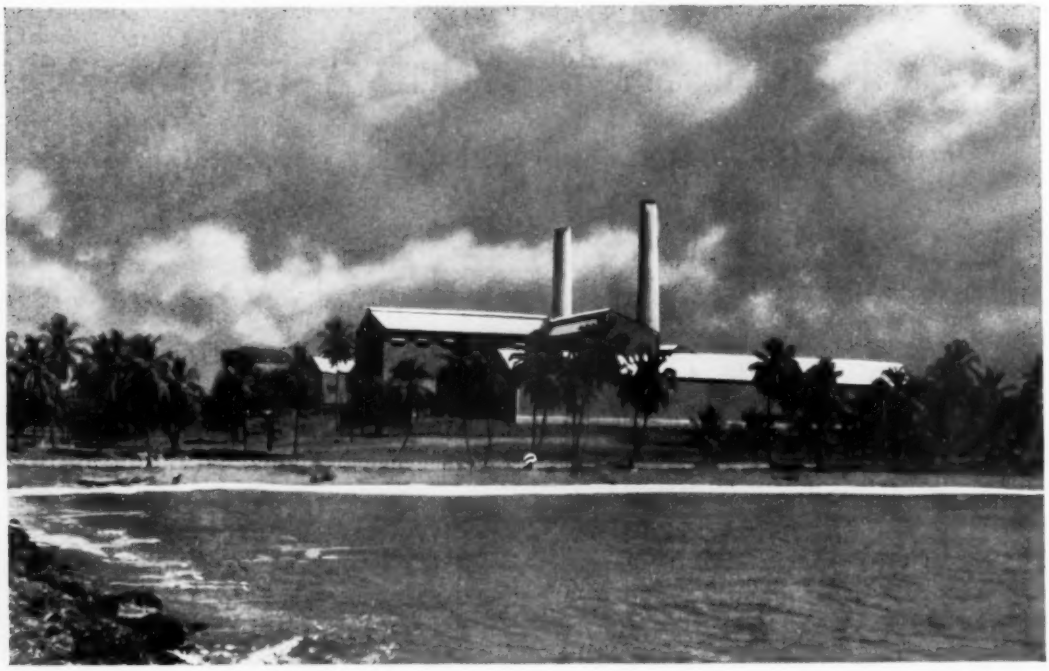
FELICIDADES A LOS TECHNICOS

A

CANA DE AZUCAR



Con Maquinaria



Central Rio Haina en la Republica Dominicana installo equipo *Mirrlees* para aumentar su capacidad de 6.500 a 13.000 toneladas de cana diario. En su ultima zafra molio 1.553.126 toneladas. Produce azucar crudo.

Mirrlees'

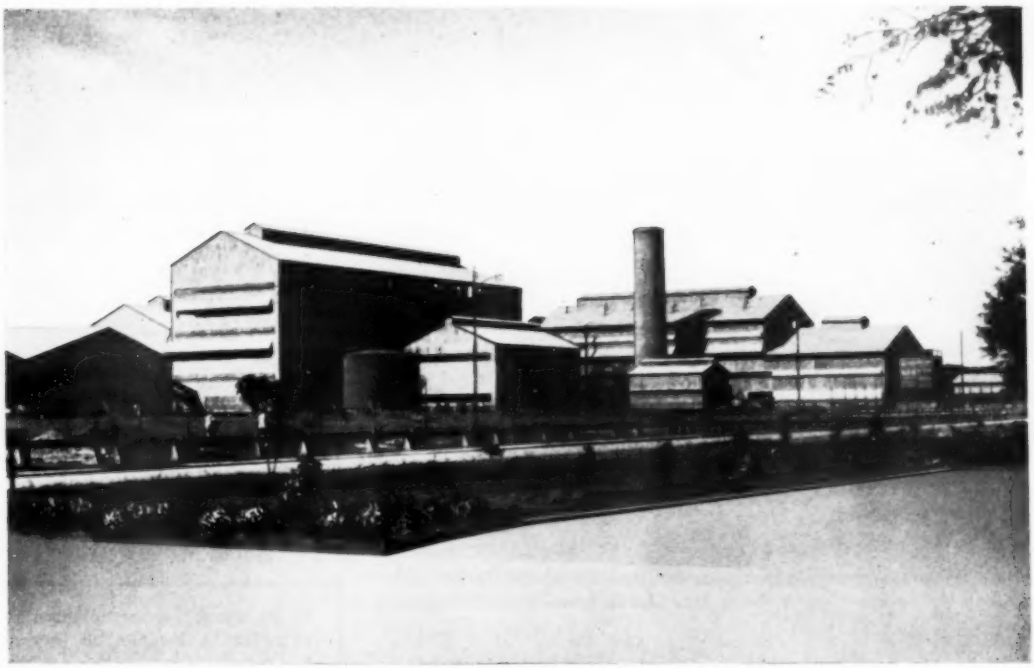
The MIRRLEES WATSON COMPANY LIMITED

SCOTLAND STREET — GLASGOW, C5

LONDON OFFICE — 38 GROSVENOR GDNS., SW. 1

AZUCAR DE CANA

Mirrlees



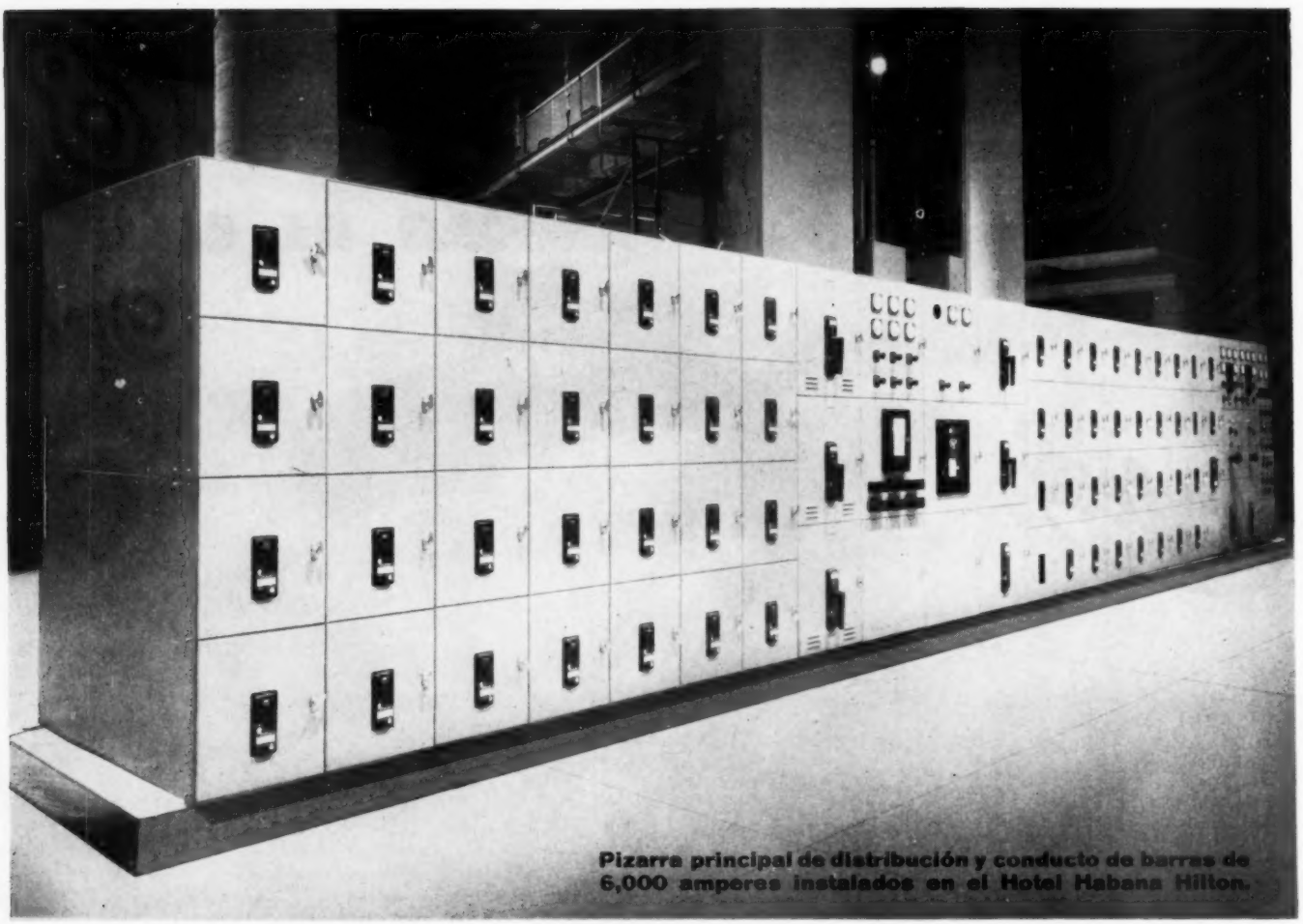
Central Rio Turbio en Venezuela el equipo para la cual fue suministrado en totalidad por Mirrlees esta molienda a su capacidad de 2,500 toneladas diarios. Produce azucar refino.

Agentes en Cuba:

VICTOR G. MENDOZA CO., S. A.

Calle 23 NO. 53 HABANA, CUBA

Mirrlees



Pizarra principal de distribución y conducto de barras de 6,000 amperes instalados en el Hotel Habana Hilton.

Modernice Ahora su Equipo de Control Eléctrico con la Ayuda de MAGESA

Un valioso aporte para la modernización de los equipos de control eléctricos de los ingenios azucareros, lo es sin lugar a duda Manufacturera General Electric. S. A. (MAGESA).

Esta nueva industria cubana especializada en la fabricación de paneles eléctricos estrictamente de acuerdo con el Código Eléctrico Nacional, cuenta con el personal técnico capacitado para realizar a fondo un estudio de sus necesidades y construirle el equipo adecuado.

En todos sus paneles de control, MAGESA utiliza exclusivamente materiales de la General Electric Company de E.U. cuya calidad está reconocida mundialmente como la mejor.

Por estar radicada en Cuba, MAGESA le ofrece a la industria azucarera la extraordinaria ventaja de poder cumplimentar sus órdenes con la mayor rapidez, ya se trate de entregas, de modificaciones o de servicio de mantenimiento.

Sin compromiso alguno, solicite un estudio a los técnicos de MAGESA sobre como puede modernizarse su equipo de control eléctrico.

En tan sólo seis meses de inaugurada su fabrica, MAGESA, ha servido ya a numerosos centrales e industrias He aquí algunos de ellos:

Central Francisco	Central Araujo
Central Adela	U.S. Rubber Co.
Central Manuelita	Hospital Camagüey
Central Romelié	Teatro Nacional
Central San Ramón	Nuevo Palacio de
Central Victoria	los Deportes
Central Caracas	Regalías El Cuño

W. R. Grace

MANUFACTURERA GENERAL ELECTRIC, S. A.

Calzada del Cerro 2,351 - Teléfono: 4-8688 - La Habana

11222

Para fabricar una tonelada de acero Bethlehem se necesita un mundo de productos. De ahí que la Bethlehem sea compradora en 41 países del globo.

En este mercado mundial la Bethlehem compra cromo, estaño, tungsteno, manganeso, espato flúor, cáñamo, caucho, pulpa de papel y substancias químicas, para incorporarlos en el acero mismo, o para usarlos en las operaciones fabriles.

Porque compra en tan grande escala en el exterior, la Bethlehem es un factor importante en la economía de muchos países, a la vez que fomenta en ellos el desarrollo industrial, proveyéndolos de productos de acero.

COMPRADOR MUNDIAL

BETHLEHEM STEEL
Export Corporation
25 Broadway, New York 4
U. S. A.

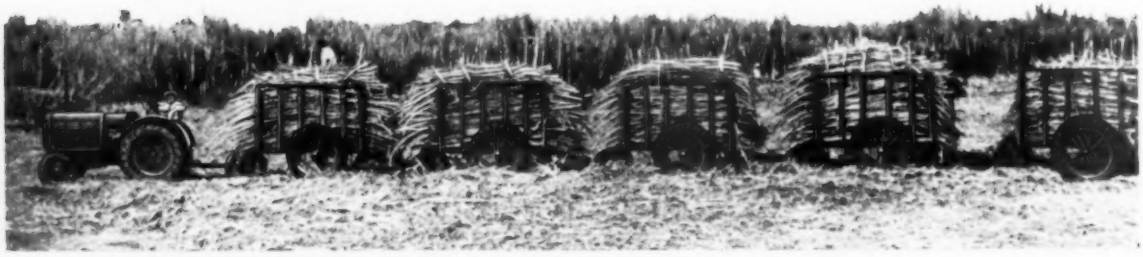
Cablegramas: "BETHLEHEM, NEWYORK"

Representada en todas las principales ciudades del mundo por las oficinas y representantes de la Bethlehem Steel Export Company

En Cuba: Bethlehem Steel Export Company, S. A.
Edificio Ambar Motors, Avenida Menocal y 23, Habana

8025

ACELERE EL TRABAJO Y AUMENTE SUS GANANCIAS



con Neumáticos Agrícolas **Firestone**

Los productores de azúcar concuerdan en que los neumáticos Firestone para tractores ofrecen mayor tracción para salir adelante bajo cualquier condición, acelerar los trabajos de recolección y asegurar entregas a tiempo a la central. La cuerda *S/F Safety-Fortified* exclusiva (cuerda reforzada para seguridad) ofrece protección adicional contra daños—las capas adicionales de la banda de rodamiento ofrecen protección contra roturas del cuerpo del neumático—la banda profunda de rodamiento resistente al desgaste ofrece mayor duración. Estos valores Firestone adicionales ofrecen más temporadas de trabajo a menor costo.

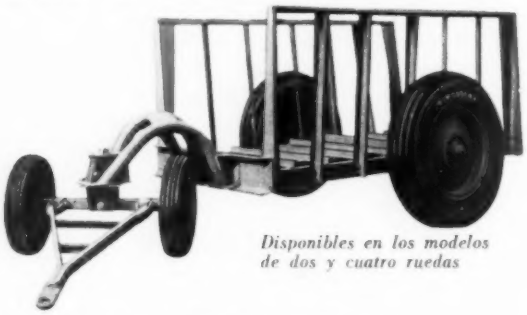
Hay un reglón completo de neumáticos Firestone para tractores y aperos de labranza para satisfacer todas sus necesidades agroazucareras.

Neumático Champion Trasero de Tracción Total para Tractor
(para casi toda condición de suelo)

Neumático Champion Trasero de Agarre-Espada para Tractor
(para tierras húmedas y fangosas)

y Carretas de Caña **Firestone** ELECTRIC WHEEL

Usted puede modernizar su recolección de caña y ahorrar dinero con las Carretas de Caña Firestone Electric Wheel dotadas de neumáticos Firestone. Estas fuertes y robustas carretas portan grandes cargas, y los neumáticos Firestone ofrecen libre rodamiento flotante sobre campos escabrosos y terrenos blandos.



Disponibles en los modelos de dos y cuatro ruedas

Comuníquese con el Distribuidor de Firestone Tire/Electric Wheel, o escriba a . . .

FIRESTONE INTERAMERICA COMPANY

AKRON 17, OHIO **E.U.A.**

La industria azucarera cubana pide 15 locomotoras diesel-eléctricas General Electric

Para incrementar la eficiencia industrial y la capacidad del acarreo, dos importantes empresas azucareras de Cuba están reemplazando sus locomotoras de servicio, a vapor, por las nuevas diesel-eléctricas General Electric.

Doce de las quince locomotoras de 720 hp (de 70 toneladas) fueron pedidas por la Cuban Dominican Sales Corporation, subsidiaria de la West Indies Sugar Corporation. Con estas nuevas locomotoras y las cuatro diesel-eléctricas General Electric ya en uso, esta empresa será la primera azucarera cubana completamente diesel-electrificada. Estas locomotoras arrastrarán 1300 carros de caña de treinta toneladas de capacidad por carro, sobre los 550 km de vías férreas de los cuatro ingenios de la West Indies Sugar Corporation.

Las otras tres diesel-eléctricas de 70 toneladas las ordenó la Manati Sugar Company, empresa que ya tenía en uso dos locomotoras G-E, una de 70 y otra de 35 toneladas.

La demanda de locomotoras G-E para usos industriales es cada día mayor. Y la General Electric fabrica una línea completa de locomotoras industriales diesel-eléctricas de todo tamaño, desde las de 25 toneladas de 150 hp hasta las de 88 toneladas de 1200 hp.

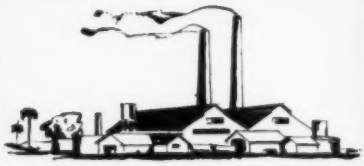
Aproveche la gran eficiencia de las locomotoras industriales General Electric. Para más informes, comuníquese con el representante más cercano de la International General Electric Company. (120-S6)

Nuestros productos son índice de progreso

GENERAL ELECTRIC

DEPARTAMENTO DE LOCOMOTORAS Y EQUIPO PARA VAGONES • ERIE, PENNSYLVANIA, U.S.A.
Representada en todas partes del mundo por la International General Electric Company
Oficinas Principales: 150 East 42nd Street, New York 17, New York, U.S.A.

Válvulas CRANE al servicio de nuestra Industria Azucarera!



CRANE CO.

se complace en anunciar que ha nombrado como Agente y Mayorista de accesorios y válvulas industriales a los

Sres.

L. G. AGUILERA & CO. S. A.

Mercaderes 213
Habana, Cuba
Teléfonos A-6524 y A-6174

En combinación con la firma L. G. AGUILERA & CO. S.A., Crane Co. continuara con sus esfuerzos para servir a la industria azucarera Cubana con sus productos—los que por más de un siglo han gozado de reputación inigualable, siendo sinonimos de confianza y calidad.

CRANE CO.

Division de Exportacion
47-30 29th Street
LONG ISLAND CITY 1, NEW YORK

Direccion Cablegrafica:
"CRANECOY NEW YORK"

Las figuras que adornan el cochinito representan algunas de las formas de las sílices diatomáceas que se combinan para hacer de *Celite* una ayuda de filtro eficaz

Cómo las refinerías de azúcar ahorran *un saco de sílice diatomácea en cada 7 con polvos de filtro CELITE**

Es fácil entender por qué las mejores refinerías confían en diatomita *Celite* para producir un gran volumen de azúcar diáfana más económicamente.

Los registros de producción muestran que *Celite* es la más económica de las ayudas de filtro: ¡6 sacos realizan el trabajo de 7 de otros *tipos* de tierra infusoria! El secreto estriba en la poca densidad aparente que hay en *Celite*. En un peso determinado, *Celite* ofrece *mayor* ayuda de filtro, al cubrir un área *mayor* de filtración.

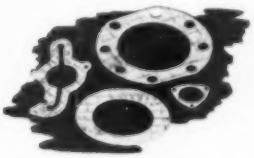
Y lo que es más importante, con *Celite*, Ud. puede lograr una purificación de cal de P_2O_5, decolorar y clarificar, en una sola operación. Ud. gasta mucho menos en carbón vegetal como decolorante, y obtiene un índice de flujo más rápido y mayor claridad. Además, habrá resuelto el problema de las bacterias termófilas.

Es muy fácil para Ud. utilizar *Celite*, porque puede seguir usando los mismos filtros y tanques mezcladores. Hay una extensa gradación, para que Ud. elija, de acuerdo con los requisitos de flujo y claridad de su refinería. Y recuerde que todos los pedidos serán de calidad uniforme, porque J-M mantiene, saco a saco, un control de su producción de *Celite*. Pida Ud. datos más concretos sobre los polvos de filtro *Celite* a Johns-Manville International Corporation, Box 60, New York, N. Y., EE.UU.

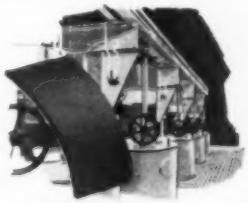
El distribuidor J-M local le dará detalles sobre las ayudas J-M para la industria azucarera . . .

Techados protegidos al máximo . . . desde azoteas horizontales hasta declives de 50 cm. por metro. J-M ofrece los techados de amianto, ya listos. Aquadam* y Flextone*.

Aislamientos para tuberías calentadas de 40° a 650°C. *Thermobestos** J-M es a prueba de corrosión, para muchas aplicaciones al aire libre. Es liviano, resistente y no se pudre.



Obturación rápida y confiable con empaquetaduras en Lámina *Service* J-M, Estilo 60: un material para obturación a toda prueba, contra vapor, gas, agua, aceites y substancias químicas. Dura mucho.



Para frenaje seguro de maquinarias centrífugas y de rotación en general, especifique los Materiales de Fricción de confianza: Johns-Manville.

*Marcas registradas

Johns-Manville
Box 60, New York 16, N.Y., EE.UU.
Sírvanse enviarme información acerca de:
- ☐ Polvos Celite
- ☐ Techados listos para colocar J-M
- ☐ Aislamientos Thermobestos
- ☐ Juntas y Empaquetaduras J-M
- ☐ Materiales Industriales de Fricción J-M

Nombre _____
Dirección _____
Compañía _____
Ciudad _____ País _____

*Celite es marca registrada por Johns-Manville en muchos países, para sus productos de sílice diatomácea.

JOHNS-MANVILLE
INTERNATIONAL CORPORATION

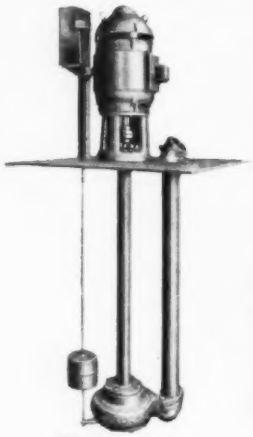
JOHNS-MANVILLE JM PRODUCTS

AURORA® PUMPS

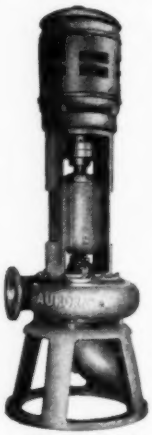
para el manejo de líquidos en fábricas de azúcar

SERVICIO EFICIENTE Y SEGURO, LIBRE DE DIFICULTADES

Hace muchos años que las bombas centrífugas Aurora y las bombas tipo de turbina Aurora Apco se vienen usando en la industria azucarera en diversos trabajos, como el bombeo de jugo crudo, jugo clarificado y meladura; lechada de cal y sosa cáustica; agua de elaboración y alimentación; condensado y combustóleo ligero. Las bombas Aurora se ofrecen para diversas capacidades y alturas, y trabajos en cualquier escala. Estas bombas están construídas para prestar un servicio duradero y libre de dificultades año tras año. Cuando requieren reparación, ésta se puede hacer rápida y fácilmente, lo que permite restablecer el servicio de las bombas y redes de tubería rápidamente.



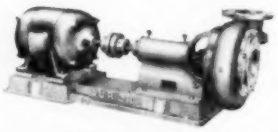
KS—De sumidero servicio pesado, inobstruible



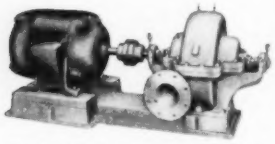
KUC—Vertical, inobstruible

BCH—Centrífuga, aspiración por el extremo

BJP—De acopladura flexible, para fines generales

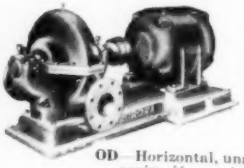


KGG—Horizontal, inobstruible



AJ—Horizontal, 2 etapas, caja partida

Serie **VI-APCO**—Tipo turbina



OD—Horizontal, una etapa, doble aspiración, caja partida

PARA INFORMACION MAS COMPLETA SOLICITE EN CATALOGO M-1 ABREVIADO

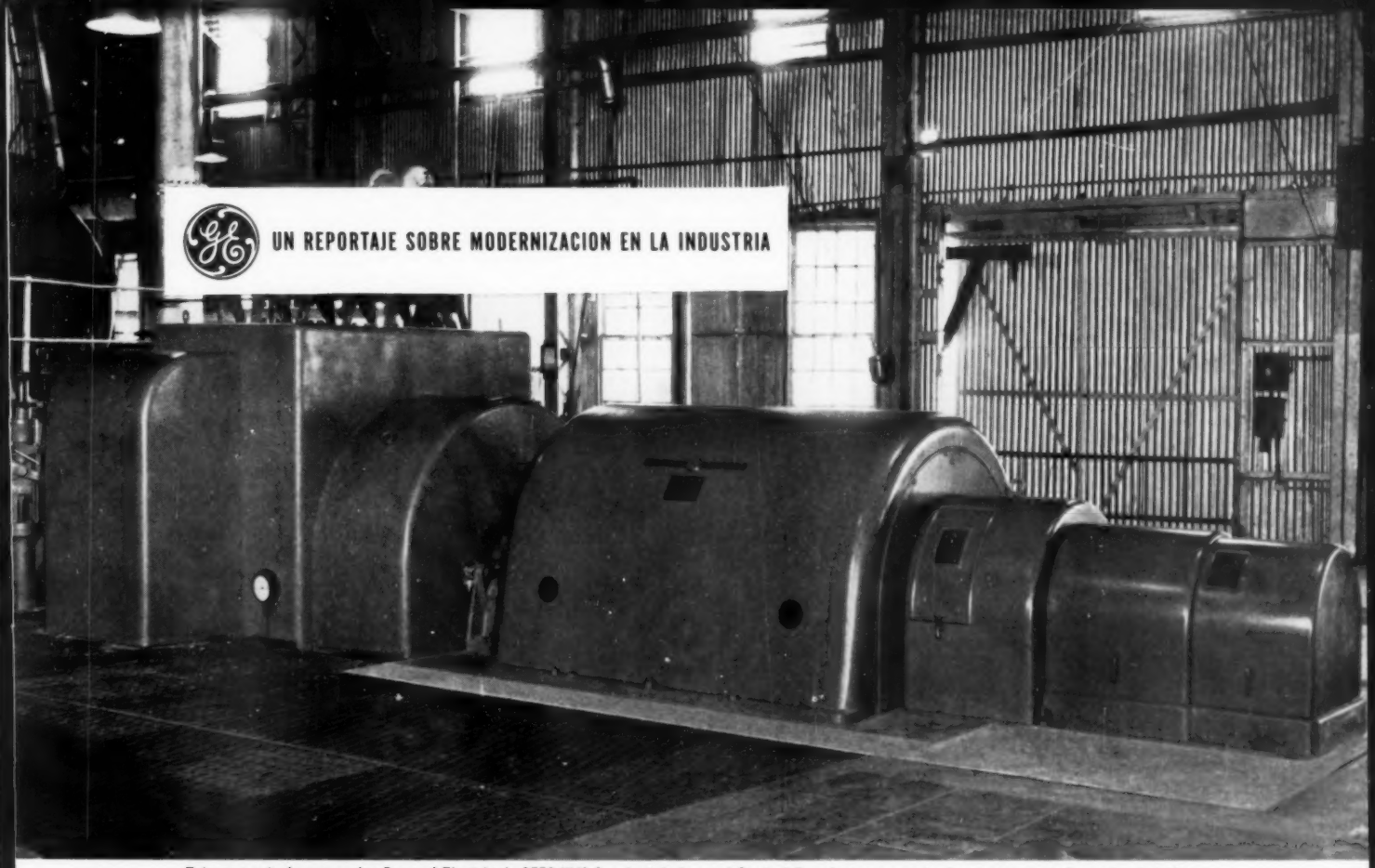
DISTRIBUIDORES EN CUBA:
Homer W. Parker y Cía.
Apartado 3446
Habana, Cuba
Teléfono FO-2610

AURORA *always* PUMPS

AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY

DEPTO. DE EXPORTACION • AURORA, ILLINOIS, E.U.A.
DIRECCION CABLEGRAFICA "NYABINT"

OVER 35 YEARS MAKING QUALITY PUMPS



Este nuevo turbogenerador General Electric de 3750 KVA fue instalado en el Central Guanica como parte de su programa de modernización.

EL CENTRAL GUANICA MODERNIZA SUS INSTALACIONES CON EQUIPOS GENERAL ELECTRIC

Un Central de Puerto Rico reduce sus costos, simplifica su operación y es ahora autosuficiente.

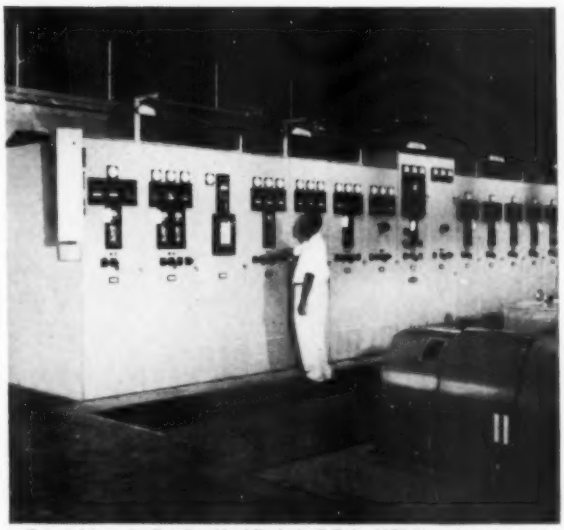
AUMENTAR LA PRODUCCION, manteniendo la economía de operación, era un verdadero problema en el Central Guanica de la South Puerto Rico Sugar Company pues, con el sistema de distribución existente, las capacidades de ruptura de los interruptores automáticos eran limitadas.

LOS INGENIEROS DEL CENTRAL GUANICA resolvieron el problema cambiando el sistema eléctrico de 480 a 4160 V. Para ello se rebobinaron los generadores existentes y se instalaron modernos equipos de maniobras G-E y un nuevo generador G-E de 3750 KVA.

Se montaron además tres subestaciones G-E de doble alimentación para centros de carga, una de 2000 KVA y dos de 1500 KVA. El nuevo sistema de distribución a 4160 V. proporciona mayor seguridad, rendimiento y economía de operación. Este sistema tiene además mayor flexibilidad y permite hacer ampliaciones con gran facilidad.

Los resultados de esta innovación en el Central Guanica se han traducido en mayor seguridad de suministro, menores pérdidas, excelente regulación de tensión y un mínimo de personal necesario para la atención de los equipos generadores. Actualmente el Central Guanica es autosuficiente en materia de energía y está además en condiciones de vender energía a la compañía de electricidad local durante períodos normales de consumo en el Central.

Para más detalles sobre cómo los modernos equipos General Electric pueden ayudarle en su programa de modernización diríjase al representante G-E más cercano o a: *International General Electric Company, Dept. 58-55S, 150 East 42nd St., New York 17, N.Y., U.S.A.*



Este tablero de distribución blindado G-E de 4160 V. proporciona al Central Guanica mayor seguridad y protección para el personal.

Nuestros productos son índice de progreso

GENERAL ELECTRIC

— E. U. A. —

Alí, el Genio dice:

Aumente los rendimientos caña de azucar, aun en las tierras más ricas, con estos 4 fertilizantes nitrogenados ARCADIAN:

Arcadian

Sulfato de Amonio
Urea 45
12-12-12
Nitrato de Amonio

Aun las tierras más ricas pueden dar mayores cosechas con ayuda de los fertilizantes nitrogenados. En cuanto a las de mediana producción, se pueden duplicar o triplicar sus rendimientos por el mismo método.

Obtenga el *máximo rendimiento* de sus tierras — use estos fertilizantes nitrogenados ARCADIAN:

Sulfato de Amonio ARCADIAN, el tipo de fertilizante nitrogenado más empleado, con un alto contenido garantizado de nitrógeno.

Urea 45 ARCADIAN, en forma granulada, de flujo libre, que contiene la mayor concentración de nitrógeno en un fertilizante seco.

12-12-12 ARCADIAN, fórmula balanceada de tres nutrientes esenciales para las plantas: nitrógeno, fosfato y potasa, en gránulos de fácil aplicación.

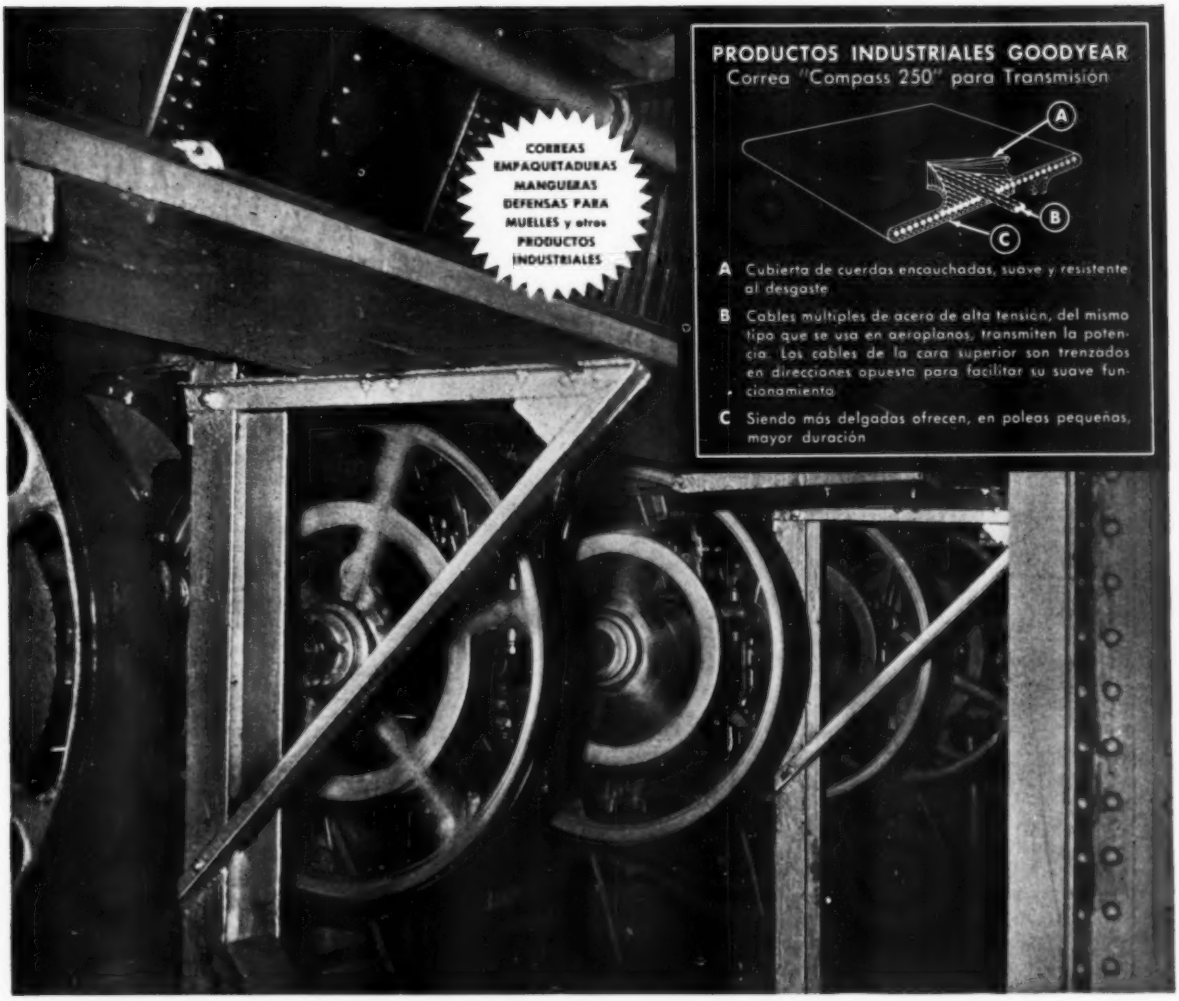
Nitrato de Amonio, 33.5% nitrógeno; aperdigonada, de flujo libre. La mitad del amonio en forma de nitrato, y la otra mitad en forma amoniacal.

Allied Chemical

Para el nombre de su distribuidor local, o para mayores informes sobre los fertilizantes ARCADIAN, escriba o cablegrafíe a: Allied Chemical International Corporation, 40 Rector Street, New York 6, N. Y., E. U. A. Dirección Cablegráfica: ALCHEMIC, NEWYORK.

"Arcadian" y "Urea 45" son marcas de fábrica de Allied Chemical & Dye Corporation

**Franquicias a distribuidores disponibles en algunas regiones azucareras.*



Las correas más suaves en funcionamiento

Los problemas interminables en una de las refinerías más importantes fueron las separadoras centrífugas de azúcar mascabado. Estos cedazos giratorios tenían que procesar miles de kilogramos de mascabado diariamente en toda la temporada de azúcar. Pero sus poleas motrices sumamente veloces y mojadas fueron la causa de que todas las correas, usadas hasta entonces, fallaran en menos de un año. Y cuando las correas fallaban, la refinería también lo hacía.

Finalmente, el ingeniero encargado de la refinería se dirigió a Goodyear. Después de estudiar las poleas motrices con sumo cuidado, Goodyear recomendó su Correa "Compass 250" para Transmisión (Véase el dibujo técnico). En el último informe, estas correas reforzadas con cables de acero estaban fuertes y en buenas condiciones después de 2½ años de servicio . . . en efecto, parece que prestarán sus servicios por muchos años más.

Para averiguar cómo Goodyear lo puede ayudar a solucionar sus problemas de correas o de cualquier otro producto industrial, refiérase a la oficina más cercana de Goodyear o escriba usted a:
Goodyear International Corporation,
Akron 16, Ohio, U. S. A.

GOODYEAR 60 GOODYEAR ANIVERSARIO

Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio, U. S. A.

Los productos Goodyear son manufacturados en: *Alemania, Argentina, Australia, Brasil, Canadá, Colombia, Cuba, Escocia, Filipinas, India, Indonesia, Inglaterra, Irlanda, Japón, Los Estados Unidos de Norte América, Luxemburgo, Méjico, Nueva Zelandia, Perú, Sud Africa, Suecia, Venezuela. Representantes, Sucursales y Distribuidores en todo el mundo.*

Concepto Moderno de Regulación de Molienda

Cuba Está Adoptando El Nuevo Sistema

Por el Ing. Ubaldo Villar

HASTA la campaña de 1950, inclusive, el central "A" y otros de la misma empresa venían empleando lo que aquí llamamos el "antiguo sistema de regulación de molienda" basado en dos postulados fundamentales:

A. La dilución % jugo normal es igual a la imbibición % caña;

B. La pureza del jugo diluído es igual a la pureza del jugo normal.

Por "jugo normal" se entiende el "jugo tal como se encuentra en la caña menos una cantidad indeterminada de agua retenida por la fibra". En la última reunión de la Sociedad Internacional de Técnicos Azucareros de la Caña se acordó abolir este concepto anticuado del "jugo normal" y se suplantó por el concepto de "jugo absoluto" que se define como la "caña menos fibra" y que se reconoce ahora como la base para el "sistema moderno de regulación de molienda". Este cambio de "lo antiguo" a "lo moderno" ha implicado un importante cambio en el método de calcular la "extracción de jugo absoluto" que una medida bastante de la "eficiencia de molienda".

Sin embargo, la mayoría de centrales azucareros en Cuba todavía siguen el viejo sistema que a la postre, aunque gradualmente, tendrá que dar paso al sistema moderno, más práctico y más flexible. Para ayudar a lograr este cambio, el autor ofrece aquí una reseña breve y de fácil comprensión del nuevo sistema.

En este sistema, para llegar al conocimiento de la "extracción de jugo absoluto", no es necesario calcular previamente el "agua de dilución" porque este dato se obtiene conociendo la diferencia entre la cantidad de jugo absolute extraído y jugo mixto. Este cálculo se puede hacer de dos modos, según los datos disponibles:

1. Conocidos los pesos de la caña, del agua de imbibición y del bagazo (este último obtenido por el cálculo previo del bagazo % caña, para lo cual se requiere una determinación directa de la fibra en la caña), se puede calcular el peso del jugo mixto.

2. Conocidos los pesos de la caña, del agua de imbibición y del jugo mixto, se puede calcular el peso del bagazo.

Caso I. *Cuando se conocen los pesos de la caña, del agua de imbibición y del bagazo:*

El peso del bagazo se obtiene por la determinación directa de la fibra en la caña en la que una muestra lo más representativa posible de la caña se desmenuza perfectamente con un aparato especial y el residuo se lava y se comprime sucesiva y alternativamente. Entonces, como el contenido de fibra en la caña y el contenido de fibra en el bagazo son iguales, tenemos las relaciones: el peso del bagazo dividido por el peso de la caña equivale a fibra por ciento caña dividido por fibra por ciento bagazo; y bagazo por ciento caña equivale a fibra por ciento caña dividido por fibra por ciento bagazo veces 100.

Una vez conocido el bagazo por ciento caña y después de multibagazo, menos brix del bagazo.

Conocidos ya los pesos de la caña, del agua de imbibición, del bagazo y del jugo mixto, así como los análisis de los distintos plicarlo por el peso de la caña, tendremos el peso del bagazo y estaremos en condiciones de calcular las arrobas* de jugo mixto, a saber:

@ Jugo mixto = @ Caña + @ Agua de imbibición — @ Bagazo.

La "fibra por ciento bagazo" que aparece en las fórmulas para determinar el "bagazo por ciento caña" tiene que ser calculada previa e indirectamente del "último jugo extraído" y del "pol del bagazo"; estos son datos promedios tomados de la hoja de análisis diaria. Para determinar el valor de dicha fibra hay que asumir que "el jugo retenido en el bagazo" tiene la misma pureza que el pol del jugo extraído entre las mazas superior y bagacera del último molino del tándem; de estos valores se calcula el brix o por ciento de sólidos solubles en el jugo mixto. Entonces, la fibra por ciento bagazo equivale a 100, menos humedad por ciento jugos y del bagazo, y habiendo determinado la fibra en el bagazo, estamos en posición de iniciar los cálculos que nos permiten obtener los valores de las distintas extracciones y determinar otras funciones que entran el el cuadro completo del sistema moderno de regulación de molienda. A continuación ofrecemos un bosquejo a grandes rasgos de los distintos pasos a seguir:

Una vez determinadas las arrobas de sólidos solubles, de pol del bagazo y de jugo mixto, y las sumas de los sólidos solubles y del pol, conoceremos las sumas de los sólidos solubles y del pol de la caña, respectivamente. Las arrobas de fibra en la caña equivalen a las arrobas de fibra en el bagazo, y si restamos este valor del peso de la caña, tendremos las arrobas de jugo absoluto. Dividiendo las arrobas de sólidos solubles en la caña entre las arrobas de jugo absoluto, tendremos el brix de este jugo; la pureza del jugo absoluto se determina dividiendo las arrobas de pol de la caña entre las arrobas de sólidos solubles en la caña. El pol del jugo absoluto se determina multiplicando su pureza por el brix correspondiente.

Entonces se hace fácil determinar las arrobas de jugo absolute extraído, dividiendo las arrobas de sólidos solubles en el jugo mixto entre el brix del jugo absoluto; conociendo las arrobas de jugo absoluto extraído dividiéndolas entre el peso de la caña, y multiplicando por 100, obtendremos el jugo absoluto extraído. Las arrobas de agua de dilución se obtienen restando las arrobas de jugo absoluto extraído de las arrobas de jugo mixto.

La extracción de pol se obtiene dividiendo las arrobas de pol en el jugo mixto entre las arrobas de pol en la caña, y multiplicando por 100. Para completar los datos que la regulación de molienda implica sólo falta calcular los distintos porcientos, cuya explicación se cree innecesaria aquí.

Caso II. *Cuando se conocen los pesos de la caña, del agua de imbibición y del jugo mixto:*

El primer paso en este método es calcular el peso del bagazo, empleando la ecuación fundamental:

*Una arroba equivale a 25 lbs., y en este trabajo está representada por el símbolo @.

@ Bagazo = @ Caña + @ Agua de embibición — @ Jugo mixto.

El procedimiento a seguir para calcular los demás valores del sistema de regulación de molienda es idéntico al descrito para el Caso I, por lo que no es necesario repetirlo.

Prosiguiendo, ahora presentamos un ejemplo de cómo se desarrolló el sistema moderno de regulación de molienda en el central "A."

Caso I. *Cuando se conocen los pesos de la caña, del agua de imbibición y del bagazo.* Los datos básicos son arrobas de caña molida (560,112) y arrobas de agua de imbibición (101,325).

Tabla I. Promedios de análisis de la caña, los jugos y del bagazo de un día dado.

	Brix	Sacarosa	Pureza Aparente
Jugo mixto	**16.14**	**13.65**	**84.57**
Último jugo extraído	**4.33**	**3.45**	**79.68**
Pol por ciento bagazo	**3.38**		
Humedad por ciento bagazo	**48.80**		
Fibra por ciento caña	**12.28**		

Los cálculos preliminares incluyen los pasos siguientes:

brix del bagazo = (3.38 × 100)/79.68 = 4.24

fibra por ciento bagazo = 100 — (48.80 + 4.24) = 100 — 53.04 = 46.96

bagazo por ciento caña = (fibra por ciento caña/fibra por ciento bagazo) × 100 = (12.28)/(46.96) × 100 = 26.15

Con estos datos procedemos en definitiva con los cálculos concernientes al sistema de regulación de molienda.

A. Cálculo de arrobas de bagazo:

@ bagazo = 560.112 × 26.15/100 = 146.469

B. Cálculo de arrobas de pol, sólidos, fibra y agua en el bagazo:

@ pol = 146.469 × 3.38/100 = 4.951

@ sólidos solubles = 146.469 × 4.24/100 = 6.210

@ fibra = 146.469 × 46.96/100 = 68.782

@ agua (humedad) en el bagazo = 146.469 × 48.80/100 = 71.477

C. Cálculo de arrobas de jugo mixto, de pol y de sólidos solubles en dicho jugo:

@ jugo mixto = @ caña + @ agua de imbibición — @ bagazo

@ jugo mixto = 560.112 + 101.325 — 146.469 = 514.968

@ pol = 514.968 × 13.65/100 = 70.293

@ sólidos solubles = 514.968 × 16.14/100 = 83.116

D. Cálculo de arrobas de fibra, de pol y de sólidos solubles en la caña:

@ fibra por ciento caña = 560.112 × 12.28/100 = 68.782

@ pol caña = @ pol jugo mixto + @ pol bagazo

@ pol caña = 70.293 + 4.951 = 75.244

@ sólidos solubles caña = @ sólidos solubles jugo mixto + @ sólidos solubles en bagazo

@ sólidos solubles en caña = 83.116 + 6.210 = 39.326

E. Cálculo de arrobas de jugo absoluto:

@ jugo absoluto = @ caña — @ fibra

@ jugo absoluto = 560.112 — 68.782 = 491.330

F. Cálculo de brix, pol y pureza del jugo absoluto:

brix jugo absoluto = (@ sólidos solubles en caña/@ jugo absoluto) × 100

brix jugo absoluto = (89.326/491.330) × 100 = 18.18

pureza jugo absoluto = (@ pol en caña/@ sólidos solubles en caña) × 100

pureza jugo absoluto = (75.244/89.326) × 100 = 84.24

pol jugo absoluto = 18.18 × 84.24/100 = 15.31

G. Cálculo de arrobas de jugo absoluto extraído:

@ jugo absoluto extraído = (@ sólidos en jugo mixto/brix jugo absoluto) × 100

@ jugo absoluto extraído = (83.116/18.18) × 100 = 457.184

H. Extracción de jugo absoluto por ciento caña:

extracción jugo absoluto = (457.184/560.112) × 100 = 81.62

I. Extracción de pol por ciento caña:

extracción de pol = (@ pol en jugo mixto/@ pol en la caña) × 100 = (70293/75.244) × 100 = 93.42

J. Extracción de jugo mixto por ciento caña:

extracción de jugo mixto = (@ jugo mixto/@ caña) × 100

extracción de jugo mixto = (514.968/560.112) × 91.94

K. Cálculo de arrobas de agua de dilución:

@ agua de dilución = @ jugo mixto — @ jugo absoluto extraído

@ agua de dilución = 514.968 — 457.184 = 57.784

L. Cálculo de los por cientos que faltan para completar la hoja de regulación de molienda:

dilución por ciento jugo absoluto extraído = (@ agua de dilución/@ jugo absoluto extraído) × 100

dilución por ciento jugo absoluto extraído = (57.784/457.184) × 100 = 12.64

dilución por ciento jugo mixto = (@ agua de dilución/@ jugo mixto) × 100

dilución por ciento jugo mixto = (57.784/514.968) × 100 = 11.22

pol por ciento caña = (@ pol caña/@ caña) × 100

pol por ciento caña = (75.244/560.112) × 100 = 13.43

imbibición por ciento caña = (@ agua de imbibición/@ caña) × 100

imbibición por ciento caña = (101.325/560.112) × 100 = 18.09

dilución por ciento caña = (@ agua de dilución/@ caña) × 100

dilución por ciento caña = (57.784/560.112) × 100 = 10.32

Por último, y a modo de comprobación, queda por verificar la ecuación:

extracción jugo mixto = dilución por ciento caña + extracción jugo absoluto o sea:

91.94 = 10.32 + 81.62 = 91.94

Estos porcientos completan la hoja del sistema de regulación de molienda para el Caso I. Ahora nos ocuparemos del Caso II, refiriéndonos solamente a aquellos puntos que difieren esencialmente del Caso I.

Caso II. *Cuando se conocen los pesos de la caña, del agua de imbibición y del jugo mixto:*

Este caso difiere del Caso I solamente en que no es el bagazo el que se determina directamente sino el jugo mixto, cuyo peso se obtiene diariamente, ya sea pesándolo o por cualquier otro modo de medición (por volumen, o por flujo a través de un Venturi u otro contador adecuado).

Conociendo el peso del jugo mixto, se calcula el peso del bagazo por la ecuación fundamental:

@ bagazo = @ caña + @ agua de imbibición — @ jugo mixto.

A parte de lo anterior, el procedimiento a seguir en los cálculos para la regulación de la molienda en el Caso II es similar al descrito para el Caso I.

El autor de este trabajo tiende a preferir el procedimiento conforme al Caso II siempre que el peso del jugo mixto se obtenga directamente o por otros medios adecuados dignos de confianza y que luego se lleve este valor a la ecuación fundamental: la experiencia nos dice que este procedimiento elimina las dudas asociadas con la determinación directa de la fibra por ciento caña. Tales determinaciones tienen que obtenerse en cada turno con muestras de caña verdaderamente representativas, partiendo de un promedio de los tres resultados diarios a fin de obtener el valor para el día. Son muchos los factores que afectan la determinación de fibra por ciento caña; los métodos de análisis son tediosos y susceptibles de marcadas oscilaciones según las variaciones en las condiciones de trabajo y pericia del personal que los practican. Otro tanto puede decirse de las determinaciones de fibra por ciento bagazo, en las que los cálculos son similarmente afectados por muchas variantes.

De lo anterior se desprende que el valor que se obtiene para el bagazo por ciento caña no ofrece mucha garantía y, en consecuencia, puede ocurrir que los resultados disten mucho de la verdad.

Todavía cabe mencionar un tercer caso para el sistema mo-

(Sigue en la página 110)

Agricultura de la Cuba

(Viene de la página 71)

de importancia económica tales como la Raya Clorótica; la Gomosis; la Escaldadura Foliar y el Carbón, que afectan a otros muchos paises, algunos muy cercanos a nosotros.

En relación con los insectos que afectan a la caña de azucar, tambien somos muy afortunados ya que son muy contados los insectos de alguna importancia económica, con la excepción del Perforador de la caña o Borer, *Diatraea saccharalis* F., pequeña mariposa cuyos gusanos se alimentan de la caña. En las Americas existen 16 especies de *Diatraea* que afectan a la caña y hay paises que tienen hasta cinco y seis espécies diferentes de estos dañinos gusanos destructores de la caña, pero en Cuba solo existe la especie nombrada.

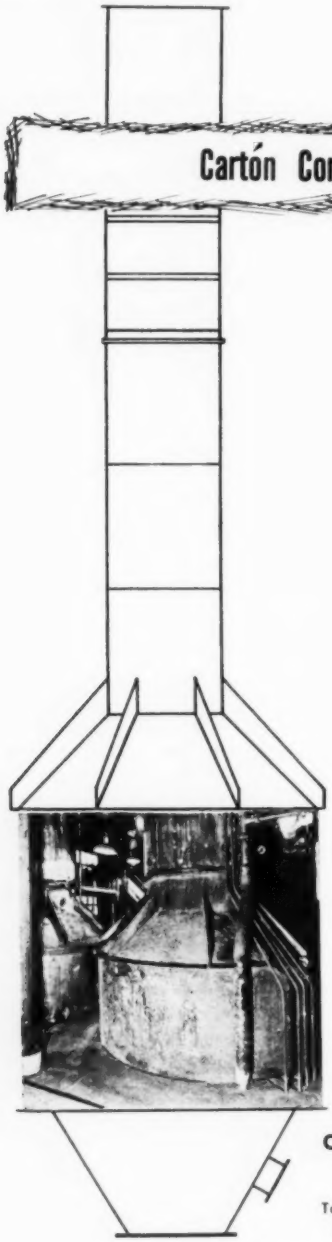
La Mosca Cubana, Lixophaga: *su pupa y la larva que mata al borer.*

La *D. saccharalis* es la de mas amplia distribución geográfica, ya que existe desde los EE.UU. hasta la Argentina y también la mas dañina de todas estimándose que sus dañinos a la caña de azucar causan una pérdida anual de unos 60 Millones de Dolares.

Se comprenderá mejor esta pérdida cuando digamos que según los cálculos de los entomólogos especializados en esta materia en los EE.UU., la pérdida experimentada en 1952 por el Estado de Luisiana solamente, fué de $9,000,000, y se esperaba que esta fuera mayor aun en 1953, a pesar del uso de varios insecticidas. En Cuba esta pérdida es de unos 10 a 12 millones de dolares al año, pero hay que recordar que la zafra de Luisiana es de apenas 500,000 toneladas, mientras que la de Cuba es de 5,500,000 toneladas o sea, once veces mayor.

El daño del borer es causado por las orugas o gusanos al perforar los canutos o entrenudos que constituyen los tallos de la caña labrando en ellos galerias o túneles o medida que se van alimentando, hasta transformarse en mariposas; estas galerias sirven de puerta de entrada para una serie de hongos, bacterias y levaduras que al multiplicarse dentro de la caña producen fermentaciones que causan la descomposición de los jugos de la caña haciendo disminuir sensiblemente la cantidad de azucar que se pudiera extraer de la misma, siendo esto la causa de las pérdidas mayores.

Se ha podido comprobar que una infestación de 15 a 20 por ciento de los canutos, representa una pérdida de 1 arroba de azucar por cada 100 arrobas de caña molida en esas condiciones, o sea una pérdida de 1.0 por ciento del azucar recobrable de la caña, lo que para cualquier ingenio representa muchos miles de dolares. Otras pérdidas están constituidas por la disminución de peso de los tallos pérforados y por la muerte de muchos tallos; muchos mueren en los primeros meses de su desarrollo, cuando son atacados por la base y otros cuando ya desarrollados, debido a las muchas perforaciones. En el benigno clima de Cuba los gusanos del borer pueden completar su desarrollo en un mes, mas o menos, por lo que se han podido contar hasta doce generaciones en un año, mientras que las temperaturas bajas afectan de tal



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Las propiedades inherentes del bagazo, aunidas a su bajo costo, lo hacen el material más adecuado para la manufactura de cartón corrugado. Debido al largo y naturaleza de las fibras, el cartón corrugado hecho el 100% de pasta de bagazo posée gran rigidez y elasticidad.

Las torres Celdecor de digestión continua ofrecen el método más sencillo y más práctico de convertir el bagazo en un medio corrugable de alta calidad. Estas torres usan solamente soda cáustica y vapor a presión admosférica, y funcionan eficiente y económicamente con el mínimo de atención. La ilustración inserta ofrece un ejemplo típico de las torres Celdecor de digestión que se están usando con éxito en varios países.

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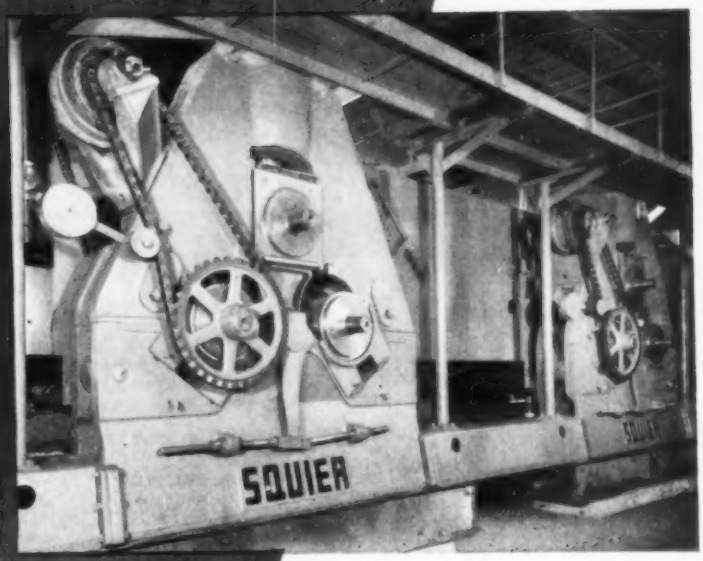
Las Mesas de Alimentación de Caña Squier entregan la caña a los Gallegos y Cuchillas Cañeras en un flujo constante y uniforme.



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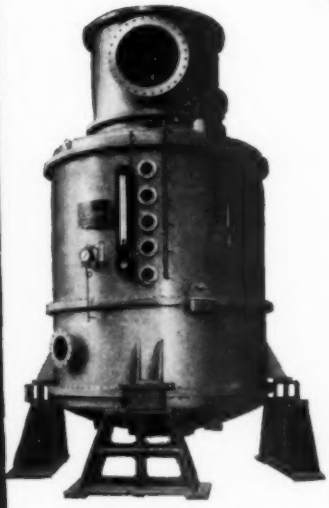

Tachos al Vacío Squier proveen una circulación rápida y natural redundando en templas rápidas.

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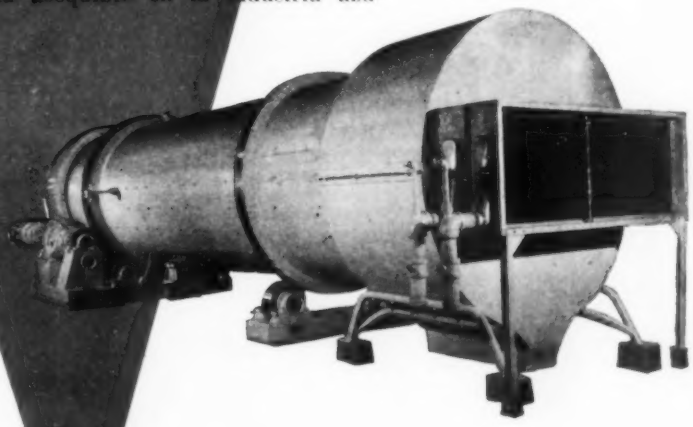

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Gusano del Perforador de la caña o borer, Diatraea saccharalis; *crisálida y mariposa.*

modo su desarrollo que en Luisiana, por ejemplo solo pueden tener de 4 a 5 generaciones al año.

A pesar de la gran diferencia en el número de generaciones del borer en estas dos regiones y de trartarse de exactamente el mismo insecto, hemos visto que existe muy poca diferencia en el valor del daño causado a pesar de la enorme diferencia en el volumen de la cosecha que como sabemos es en Cuba once veces mayor. El porque de esta situación es altamente interesante y es lo que vamos a tratar de explicar: Casi todas las plagas de las cosechas del mundo tienen sus enemigos naturales o parásitos, es decir otros insectos que se han adaptado a vivir de la plaga, estableciendo así un equilibrio, sin el cual los insectos dañinos se multiplicarían en tal número que destruirían las cosechas haciendo imposible la vida para el hombre y los animales domésticos. Este equilibrio se conoce con el nombre de control biológico y es lo que sucede en los campos de caña de Cuba y no sucede en los de Luisiana con respecto al borer.

El borer tiene en Cuba una larga lista de enemigos naturales que comprende mas de 10 especies, desde minúsculas avispitas que destruyen los huevos, hasta lagartijas que se alimentan de los gusanos y las mariposas, pero de todos ellos el mas importante y efectivo es una pequeña mosca conocida en la literatura entomológica bajo el nombre de "Mosca Cubana" y cuyo nombre científico es *Lixophaga diatraeae* Tns., cuyo parasitismo es mayor que el de todas las demás especies combinadas.

Debido a la presencia de estos enemigos naturales del borer en Cuba, el empleo de insecticidas para combatirlo no es recomendable, pues en los ensayos realizados los resultados fueron contraproducentes, comprobándose que disminuía el parasitismo y aumentaba el daño del borer. En ciertas regiones de Cuba donde los parásitos y especialmente la Mosca Cubana encuentran condiciones mas favorables para su desarrollo, el borer causa poco daño, pero cuando las condiciones son adversas para su desarrollo, o cuando el fuego destruye los campos diezmando su número, o se presentan largos periodos de sequía, entonces se hace necesario ayudar a la naturaleza criando artificialmente los parásitos del borer.

Criando la Mosca Cubana para efectuar sueltas en los campos según el método del autor publicado hace mas de 25 años, se puede lograr en poco tiempo reducir a menos de la mitad una infestación como la descrita anteriormente y, lo que es muy importante, a un costo de unos pocos miles de dolares al año; tan bajo es el costo que apenas si alcanza al 1.0 por ciento de las pérdidas que causa.

Pero veamos como trabaja esta mosca; la *Lixophaga* se multiplica exclusivamente en los gusanos del borer por lo que forzosamente tiene que buscarlos para subsistir, con la particularidad que solo ataca a los gusanos de la *Diatraea saccharalis*, pero no a las otras especies. La mosca se alimenta del dulce jugo de la caña que chupa alrededor de los agujeros frescos abiertos

(Signe en la página 104)

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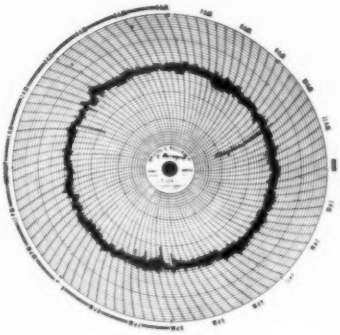

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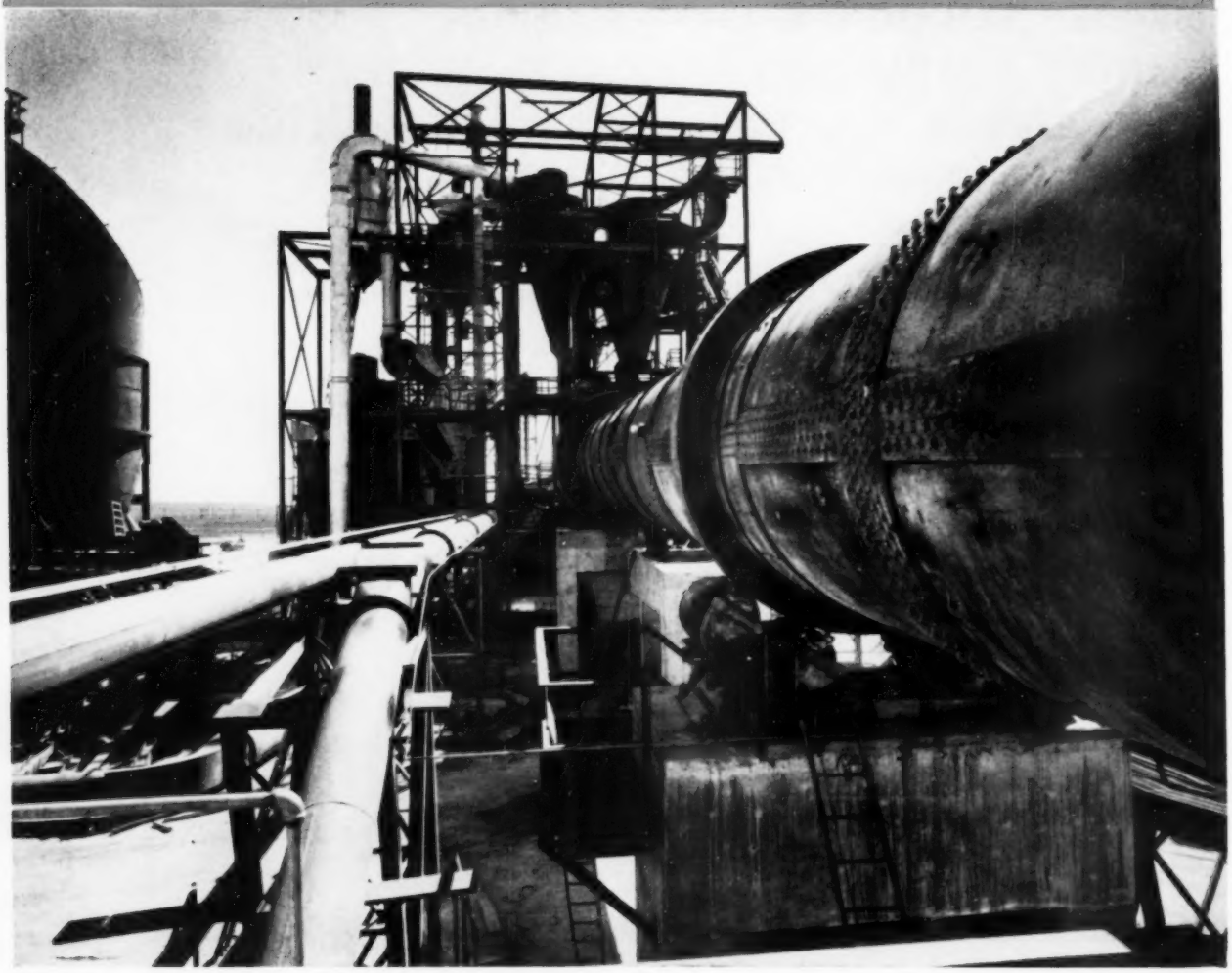
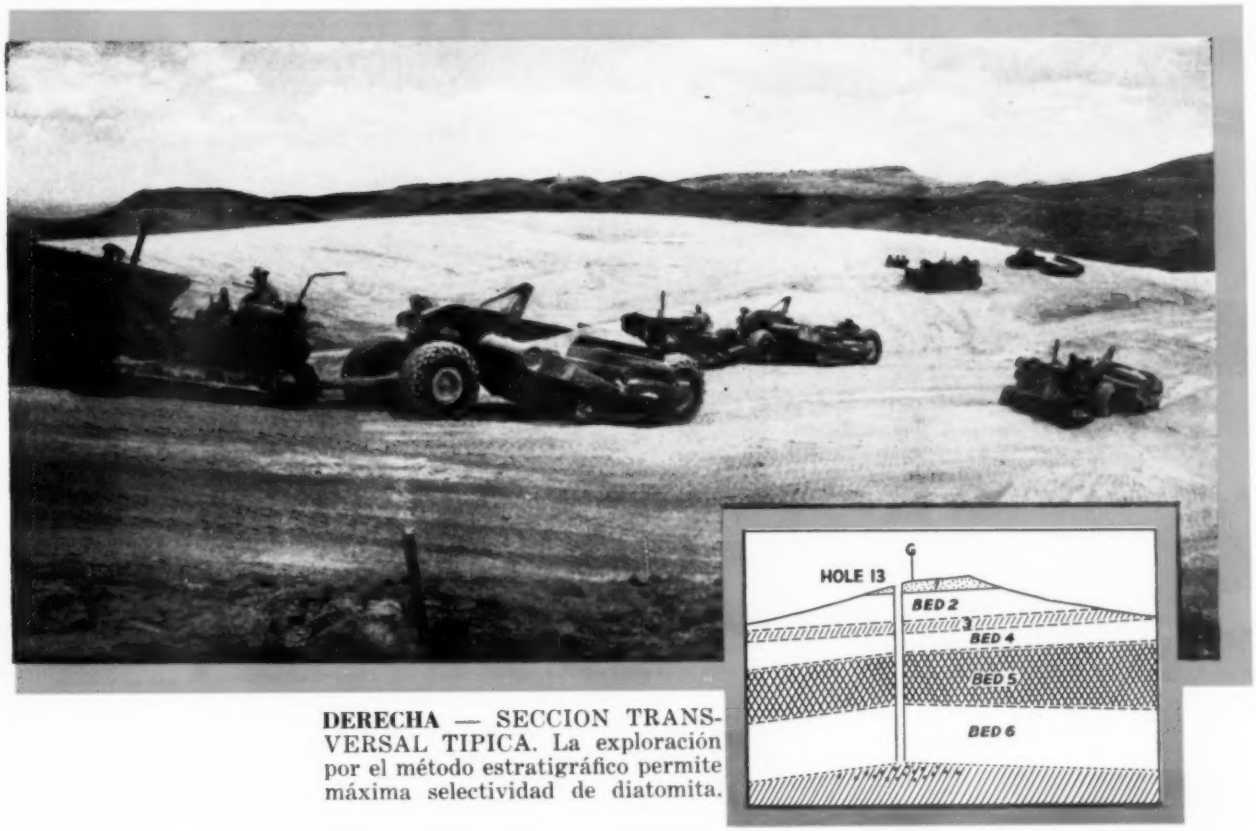




DERECHA — SECCION TRANSVERSAL TIPICA. La exploración por el método estratigráfico permite máxima selectividad de diatomita.

Esta nueva fábrica de auxiliares filtrantes Celatom, valorada en millones de dólares, es el resultado de más de cinco años de extensa exploración geológica, de estudios en el campo y en el laboratorio, y de avance y aplicación técnicos.

Durante el programa de exploración, la Eagle-Picher estudió depósitos de diatomita en nueve estados al oeste de Estados Unidos, en el Canadá y en México. Fueron examinadas microscópicamente centenares de muestras de cada una de estas regiones, y fueron elaboradas en auxiliares filtrantes en escala experimental. Estos ensayos demostraron que los depósitos de diatomita en el condado de Pershing, estado de Nevada, son de calidad excepcionalmente buena, que mejoran el régimen de flujo y la claridad del licor, y que contienen varios millones de toneladas de diatomita del tipo propio para auxiliares filtrantes.

En la exploración de estos depósitos, la Eagle-Picher empleó un ingenioso método de pruebas estratigráficas. Se abrieron hoyos o pozos de 36 pulgadas de diámetro en centros de 100 pies, hasta más de 100 pies de profundidad. De cada una de estas perforaciones, y a intervalos máximos de 5 pies, se extrajeron grandes muestras de diatomita para su análisis. Cada muestra fue detenidamente graduada en el laboratorio de Estudios Celatom, donde se registraron sus características filtrantes. Este método de pruebas estratigráficas hace que la Eagle-Picher pueda minar selectivamente y mantener en existencia diversos grados de diatomita.

Esta fábrica moderna, provista de los últimos instrumentos de regulación, le asegura al comprador un suministro continuo y permanente de auxiliares filtrantes que satisfacen las más altas normas de calidad y uniformidad.

El personal técnico, de estudios y de ventas de Eagle-Picher está a su disposición para ayudarlo a resolver sus problemas de filtración. Diríjase a nosotros por escrito, telégrafo o teléfono cuando quiera.

Desde 1843

EAGLE EP PICHER

EAGLE-PICHER

The Eagle-Picher Company, Oficinas Generales: Cincinnati 1, Ohio, E.U.A.

Para combatir la maleza que invade la caña de azúcar sin cortarla, úsese

2,4-D y DOWPON

de

DOW

Los cultivos de caña de azúcar dan más rendimiento cuando los cañaverales están libres de maleza. De modo que se gana más combatiendo las malezas de hoja ancha y gramíneas de la forma más eficaz y económica que sea posible; es decir, con los matamalezas Dow.

El Matamalezas 2-4 Dow Fórmula 40*, acaba con la maleza de hoja ancha. El Dowpon* combate la maleza resistente que antes había que cortar o azadonar. Con estos productos químicos modernos, usados por separado o mezclados, según el problema que se tenga que solucionar, se combaten los pastos y las malas hierbas. Ambos pueden aplicarse con rociadores de mano o mecánicos. Pida más informes al representante más próximo de Dow o a la oficina de Dow Inter-American que le corresponda.

**Marca de fábrica de The Dow Chemical Company, EE. UU.*

DOW CHEMICAL INTER-AMERICAN LIMITED • Edificio La Comercial, Paseo de la Reforma 122, México D. F. • Belgrano 1670, Buenos Aires, Argentina • P. O. Box 488, Hato Rey, Puerto Rico Midland, Michigan, EE. UU.

HOY Y MAÑANA... CONFIE EN DOW

Tecnicos Azucareros de Cuba

(Viene de la página 66)

Provechoso del Bagazo". Autor: Lesmoir R. Bliss.

Diploma por Servicios Distinguidos: Por su actuación durante el año social presentando un número no menor de diez socios: Arnaldo Ricciardi y Lucio Rodríguez.

Título de Agradecimiento: Este título se concede a las personas y entidades, socios o no, que hayan prestado su concurso desinteresado, moral, material y/o personal al éxito de la Conferencia Anual de la Asociación o de actos conmemorativos organizados por la misma.

Por haber tenido a su cargo, a invitación de la Asociación, la disertación medular del acto de apertura a la Conferencia Anual titulada: "La labor realizada por el Instituto Cubano de Investigaciones Tecnológicas desde su Fundación": Emiliano Ramos.

■

Reunión de Técnicos Azucareros de Puerto Rico en San Juan

Se ha preparado un programa extraordinariamente interesante para la Reunión Anual de la Asociación de Tecnólogos Azucareros de Puerto Rico, haciendo hincapié sobre el efecto de la mecanización en las prácticas agrícolas y en las operaciones fabriles. Esta reunión se celebrará en el Hotel Caribe Hilton en San Juan los días 5 y 6 de diciembre próximo.

El día 5, los agrónomos y los técnicos de fábrica se reunirán por separado. Los agrónomos oirán la lectura de los trabajos presentados y discutirán los diversos métodos de cultivo y sistemas de recolección mecánicos, así como la conservación de maquinaria agrícola. Al mismo tiempo, los técnicos de fábrica se ocuparán de los problemas creados en las fábricas por la basura y piedras rebidas con cañas recogidas y cargadas con equipos mecánicos; del aumento en el ritmo de molienda para guardar paso con las exigencias creadas por la mecanización; de las plantas de limpieza de la caña; y de los nuevos métodos de clarificación.

El día 6, los técnicos de ambas secciones de la industria tendrán una reunión conjunta para oir la lectura de trabajos de mutuo interés.

Escoja los potentes Tractores Diesel Farmall McCormick International para los trabajos en su cañaveral...

FARMALL 450 hecho en E.U.A. tirando de un tren de carretas de caña. Cambia de velocidad mientras avanza, con amplificador de torsión que aumenta la fuerza de tiro hasta en un 45%.

INTERNATIONAL HARVESTER

...con implementos especiales para cada tarea!

FARMALL 450-D – Este gran tractor diesel de 57 hp tiene cuanto dispositivo motriz hay: Amplificador de Torsión, Control de Tracción, Enganche Rápido, control hidráulico de implementos, dirección motriz y toma de fuerza independiente. Modelo regular o de luz alta. Ruedas delanteras intercambiables. Con el 450-D dispone usted de más fuerza, inigualable economía y rendimiento.

FARMALL SUPER BMD – Este tractor diesel de 50.5 hp, con enganche de tres puntos y controles hidráulicos, es ideal para la aradura de los campos de caña y el cultivo y arrastre de la caña. De funcionamiento económico y fácil mantenimiento, ofrece plena visibilidad y altura, con eje delantero y eje trasero de ancho de vía ajustable.

FARMALL D-430 – El Farmall D-430 ofrece al cultivador de caña toda ventaja en un tractor pequeño: rendimiento confiable y económico, fácil mantenimiento y resistente construcción. Cuenta con un potente motor diesel de 30 hp., exclusiva transmisión IH Agriomatic de doble engranaje, y fiador de diferencial de liberación automática.

Nuestro 2do. medio siglo de fabricar tractores . . . más de 3.300.000 tractores construidos . . . más de 50 años de suministrar tractores a través del mundo.

INTERNATIONAL HARVESTER

International Harvester Export Company
180 North Michigan Avenue, Chicago 1, Illinois, E.U.A.

FARMALL SUPER BMD hecho en Inglaterra, con cultivador de subhojarasca que ara a más de 30 centímetros de profundidad mientras corta la hojarasca al mismo tiempo. El cultivador es parte de un renglón completo de implementos para caña que fabrica la IH en México.

FARMALL D-430 hecho en Alemania, con implemento para caña fabricado en México que consiste en dos discos recortados, aporcador y cuchilla circular; cultiva a una profundidad de más de 20 cms., sin quitar la hojarasca.

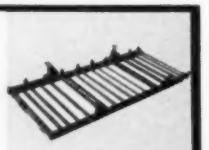
EL VERSATIL
SISTEMA DE CARGA
LOAD LUGGER
DE BORG-WARNER

¡Un Load Lugger B-W vuelca caña cortada a razón de más de una tonelada por segundo!

En una plantación cubana de azúcar, el Sistema de Carga Load Lugger ahorra tiempo y trabajo. Las paletas Borg-Warner, con costados de estacas, se cargan en el campo, se levantan, transportan, vuelcan, devuelven y depositan nuevamente para volverlas a cargar.

Los Sistemas de Carga Load Lugger hacen igualmente bien muchos trabajos diferentes: Manipulan líquidos, sólidos y gases a costo mínimo.

Fabricados por la División Ingersoll Kalamazoo de la Borg-Warner Corporation



La Paleta Load Lugger B-W facilita la manipulación de cualquier carga larga y de difícil manejo.

La paleta cargada en el campo está lista para ser levantada y depositada en la caja del camión mediante el botalón Load Lugger.

El camión acarrea caña cortada al trapiche, regresa y deposita la paleta vacía. Mientras el camión vuelca la paleta llena, se cargan otras.

INTERNATIONAL BW BORG-WARNER
DIVISION INDUSTRIAL
Borg-Warner
International Corporation
36 So. Wabash, Chicago 3, E.U.A. Cables: BORINTCO

LOS RECIPIENTES DE CARGA LOAD LUGGER SE LEVANTAN, TRANSPORTAN, VACÍAN Y DEVUELVEN

Agricultura de la Cuba

(Viene de la página 98)

en la caña por el borer, los que generalmente están rodeados de aserrin empapado en jugo y como siempre se alimenta antes de depositar sus larvitas o embriones, para asegurar que la puesta no se desperdiciará en un agujero viejo. Esta mosca pone larvitas vivas en lugar de huevos y estas penetran en la galeria abierta por el borer, lo buscan y se le introducen en el interior para alimentarse, matándolo al cabo de 5 a 6 dias, para formar despues su pupa o capullo. Diez dias mas tarde saldrá una mosca de la pupa, que si es hembra, despues de haberse apareado comenzará pocos dias mas tarde a poner larvitas para iniciar el ciclo de otra generación. Como cada mosca alberga mas de 200 embriones y el ciclo completo dura menos de un mes, unas pocas generaciones son suficientes para producir números astronómicos de estas moscas y de ahi su gran eficacia.

En los laboratorios donde se crian estas moscas, se las mantiene en jaulas cilíndricas de alambre, cubiertas de lienzo blanco de algodón, en las que se colocan según el tamaño de las jaulas, de 25 a 50 parejas; un pequeño número se utiliza en el laboratorio para multiplicarlas artificialmente extrayendo las larvitas con ayuda de un microscopio, las que se siembran en gusanos de borer por medio de un pincel fino y 8 dias mas tarde se obtienen las pupas para continuar la cria. La eficiencia de estas inoculaciones generalmente pasa del 90 por ciento y un técnico con dos ayudantes puede facilmente producir 10,000 moscas al mes durante la primavera y el verano. Para colonizar los campos infestados por el borer se sueltan las moscas en éllos, a razón de 50 a 150 parejas por "Caballería", medida agraria usada en Cuba y que equivale a 33 acres o 13 Has.

Esta mosca es nativa de las Grandes Antillas, pero ha sido introducida en muchos paises, habiendo dado excelentes resultados cuando las condiciones ecológicas eran favorables, pues estos insectos son muy sensibles al clima. Asi, por ejemplo, en Cuba hemos tratado de introducir otros parásitos de Sur América, como las moscas *Parathere sia claripalpis* V.d.W., de la isla de Trinidad y del Perú, o la *Metagonistylum minense* Tns., de la región Amazónica, pero aparentemente no pudieron adaptarse pues no se logró su establecimiento.

A pesar del éxito alcanzado en muchos lugares de Cuba, es incomprensible que el uso de este sencillo y poco costoso método de combatir el borer no esté mas extendido y aunque el número de los ingenios que lo están utilizando va en aumento año tras año, creemos que solo alcanzan a un 20 por ciento los ingenios que lo utilizan.

Para citar algunas cifras diremos que en 1957 la cantidad de moscas *Lixophaga* soltadas en 12 ingenios de Cuba y por la Estación Experimental de la Caña, llegó a la cantidad de 265,035, distribuidas en la siguiente forma:

Ingenios de la Cia. Atlántica del Golfo: Alava, Conchita, Mercedes, Lugareño y Rosario	**86,868**	
Centrales Francisco y Elia	**54,691**	
Central Toledo	**32,000**	
Central Cuba	**31,000**	
Central Adelaida	**21,300**	
Est. Exp. de la Caña	**15,000**	
Central Triunfo	**12,358**	
Central España	**12,000**	
Total	**265,035**	**moscas *Lixophaga*.**

Esto es tan solo una relación parcial ya que existen otros ingenios donde tambien se llevan acabo sueltas de *Lixophaga* en cantidades que desconocemos, pero estos números dan una idea del trabajo que se está realizando y que algún dia tendrá que generalizarse para mantenernos en el lugar que nos corresponde por nuestra producción, para evitar que un pequeño gusano continue destruyendo azúcar por valor de tantos millones de pesos todos los años.

■

Trapiche de Dieciocho Mazas para Brasil

Recientemente, la Usina Itaiquara de Acucar e Alcool, S. A. de Brasil ordenó de la George Fletcher & Company de Derby, Inglaterra, un tren de molienda de 18 mazas de 26 por 48 pulgadas. El tándem vendrá completo con mesa de alimentación, transportador de caña, desfibradora Gruendler, acumuladores hidráulicos, transportadores intermedios y coladores de jugo. Cada molino será movido individualmente por motores eléctricos. El valor de este equipo pasa de $5,000,000, el cual viene a reemplazar un tándem Fletcher adquirido en 1937.

■

Venta de la Pott, Cassels & Williams

La Mirrlees Watson Company de Glasgow, Escocia, anunció su compra de la firma de Pott, Cassels & Williamson Company. Ambas empresas son importantes fabricantes de equipo para fábricas de azúcar, cuyas instalaciones se encuentran en servicio en fábricas de azúcar en todo el mundo. La Pott, Cassels & Williams Company continuará operando bajo su nombre.

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AMERICAN EXPRESS NOMBRADA AGENCIA VIAJES OFICIAL PARA 10° CONGRESO SOCIEDAD INTERNACIONAL DE TECNOLOGOS AZUCAREROS DE CAÑA A CELEBRARSE EN HONOLULU MAYO 3 a 23, 1959. LA AGENCIA VIAJES MAS GRANDE Y COMPLETA DEL MUNDO LISTA CON ACOMODACIONES SELECTAS DE HOTEL Y TRANSPORTE Y 1 a 13 DIAS ESTIMULANTES EXCURSIONES PUNTOS DE INTERES ISLAS ADYACENTES. DELEGADOS DEBEN HACER ARREGLOS INMEDIATAMENTE POR ESCRITO O PERSONA CON OFICINA AMERICAN EXPRESS MAS CERCANA.

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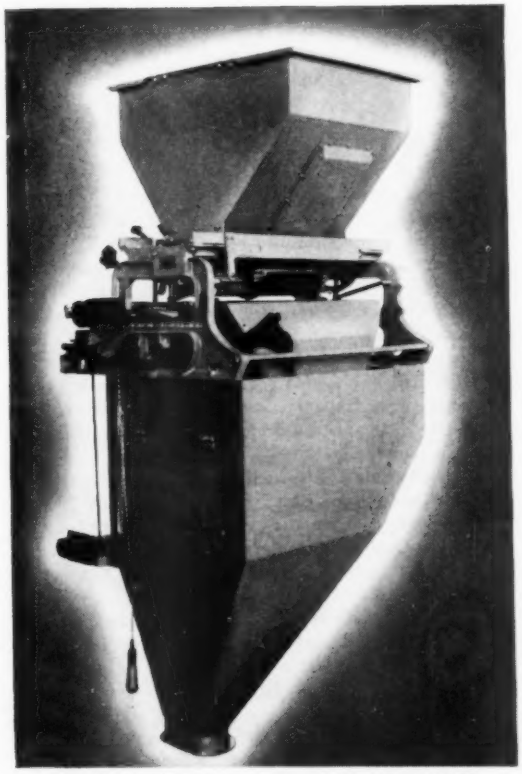

Los Básculas Richardson se ajustan a las Normas H-44 de Pesos y Medidas de EE. UU. *para su protección.*

Aumente la Producción y Reduzca los Costos de Envase con la Báscula

Richardson FFF Automática

En la industria azucarera—cada día más extensa—la Báscula Richardson Modelo FFF le puede ayudar a mantener los costos de producción al mínimo y aumentar sus ganancias. La Richardson FFF—especialmente diseñada para envasar azúcar refino—llena los sacos más rápidamente y evita pérdidas de ganancia por costosos "sobrepesos". Su funcionamiento fácil y seguro mantiene un ritmo constante de producción.

Estos importantes detalles hacen la Richardson su mejor adquisición:

- Funcionamiento rápido—diez sacos de 100 lbs. por minuto.
- Exactitud—±2 onzas.
- Construcción de acero inoxidable—para larga protección.
- Fácil de operar con gastos mínimos de conservación.
- Cuenta exacta por contador de "vuelta a cero".

Modernice su ingenio con una Báscula Richardson respaldada por 55 años de experiencia en la industria azucarera.

Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1903

RICHARDSON SCALE COMPANY, CLIFTON, NEW JERSEY, E.U.A.

Sucursales de Ventas y Servicio en los Principales Ciudades.
También se Fabrican en Europa Conforme a Normas de EE. UU.

Extractos de Publicaciones Azucareras

Publicados bajos los Auspicios de la

Sociedad Internacional de Tecnólogos Azucareros de Caña

por Arreglo Especial con

SUGAR y AZUCAR—Dr. O. W. Willcox, Redactor Técnico

Agronomía

Pago por Cañas en Martinica a Base del Contenido de Azúcar

HENRI HAYOT, *Revue Agricole Sucrerie Rhumiere Antilles Francaises*, Vol. 2, No. 4, págs. 167-175 (1957).

En Martinica se está tratando de establer un sistema de pagos por caña a base del rendimiento en azúcar. La base matemática de este sistema es la fórmula de Hugot para el azúcar obtenible:

Rendimiento de azúcar K (1 — 1.4f) BI (PI — 30)/100

donde *f* es la fibra por ciento caña, *BI* el Brix del primer jugo extraído, y *PI* la pureza de ese jugo. La fórmula de Hugot se está usando con resultados satisfactorios en la Isla de Reunión, donde los cosecheros de caña están constituídos en grupos regionales, cuyas condiciones de suelo, clima y topografía son similares, y producen de 500 a 2000 toneladas de caña al año. Sin embargo, resulta impráctico adaptar el sistema de grupos a Martinica, donde los terrenos son sumamente variados y quebrados, y cruzados por numerosos caminos y senderos, y donde los cosecheros siembran variedades de caña de distintas calidades y entregan de cinco a 50 toneladas cada temporada. Ante tales condiciones, el jugo de cada partida de caña tiene que ser analizado por separado. Para adquirir la experiencia necesaria, el año pasado se llevaron a cabo ensayos preliminares en dos fábricas, cada una de las cuales muele alrededor de 1000 toneladas de caña diarias. En vista del gran número de pequeñas partidas, fue necesario formular un plan para identificar rápida y exactamente cada partida en el conductor de caña y tomar muestras individuales del jugo en el primer molino, lo que requería estrecha coordinación y sincronización de parte del operador del conductor, de los tomadores de muestras y del químico. Esta coordinación creó ciertas dificultades, pero éstas se vencieron satisfactoriamente.

El problema de determinar la fibra por ciento caña, lo cual se hace necesario para calcular el rendimiento de azúcar por ciento caña, presentaba una gran dificultad. El análisis de la fibra es un trabajo que requiere mucho tiempo, y si se practicase en cada pequeña partida de caña, ocasionaría un gasto prohibitivo. Por tal razón, se acordó, como último recurso, depender del hecho que la fibra por ciento caña es una función de la variedad de caña. El Technical Cane Center (Centro Técnico de Análisis de Caña) local fue encargado de informar cada dos meses sobre el contenido de fibra de cada variadad de caña recibida en la fábrica. En las fechas designadas, el operador del conductor toma una muestra de cada partida de caña, anota la variedad, y envía las muestras al laboratorio central, donde se determina la fibra, y este dato se transmite a los químicos del central para el cálculo de *K*, que representa el coeficiente de eficiencia del central. Según Hugot, *K* debe equivaler a 1.20, por lo menos, y debe ser una cifra promedia resultante de un período de cinco campañas sucesivas. Por lo tanto, el establecimiento de una fórmula determinante para Martinica requerirá cinco años, por lo menos, desde la fecha que el sistema se extiende a todos los centrales. Cualquier fábrica que no pueda alcanzar el coeficiente patrón en cinco años, se le concederá más tiempo para mejorar sus facilidades y métodos. En el ensayo preliminar, una de las dos fábricas obtuvo un *K* de 1.177 y la otra 1.236, lo que indica que la norma deseada se puede obtener y hasta se puede superar.

Conforme al sistema actual de pagos por el peso, el precio en 1957 por tonelada de caña en Martinica fue 4000 francos. Se anticipa que bajo el sistema de pagos por el contenido de azúcar en la caña, el precio será algo mayor, de modo que todos los cosecheros se beneficiarán por el cambio; el gran número de pequeños e ineficientes cosecheros probablemente recibirán mayor beneficio, proporcionalmente, que los pocos cosecheros en gran escala.

■

Tratamiento Duoactivo de la Caña de Semilla para Estimular la Germinación

R. MUTHUSWAMY y P. ARAVAMUDHAN, *Indian Sugar*, Vol. 7, No. 8, págs. 523-526 (1957).

En la región septentrional de la India, el clima es subtropical y el período de crecimiento de la cosecha de caña sólo dura ocho meses. Durante parte de este período (febrero y marzo), la cosecha se desarrolla lentamente debido a la germinación retardada por el tiempo frío, lo que deja solamente seis meses de crecimiento activo. Las siembras en otoño resultan imprácticas porque las últimas cañas no se retiran del campo hasta noviembre, cuando el tiempo ya es demasiado frío para el desarrollo vegetativo. La siembra en plena escala podría hacerse en tierras cosechadas en octubre, pero las continuas lluvias durante este mes hacen impráctica la preparación del terreno para la siembra.

Ahora, una extensa serie de pruebas ha demostrado que esta dificultad se alivia en gran parte cuando la semilla de caña sembrada en noviembre se remoja por espacio de diez minutos en una mezcla compuesta de un fungicida y un insecticida; el primero protege los trozos de semilla contra el hongo y el segundo contra los insectos. Bajo tales condiciones, del 43.25 al 45.47% de los trozos de semilla tratados habrán germinado para la segunda semana de marzo, contra sólo el 30% de las semillas no tratadas. Esto le da a la nueva cosecha un comienzo más temprano y los rendimientos, tanto de caña como de azúcar, serán considerablemente mayores.

Las mejores combinaciones de fungicida e insecticida para este fin son: (1) Aretan (3%), ½ libra, más Chlorodane E.C. (75%), ½ libra, en 10 galones de agua; (2) Aretan, como antes, más Aldrin E.C., ½ libra; (3) Aretan, como antes, más Dieldrin W.P., ½ libra.

¡Aumente Sus Ganancias!

...en el central,

use BSM-11

Un fungicida y bactericida sumamente eficaz . . . en combinación con un insecticida compatible (como Aldrex-2) . . . para el tratamiento de los trozos de semilla. Controlando la pudrición y los ataques de insectos, usted fomenta la germinación.

He Aquí Prueba del Aumento en Germinación

(EXTRACTO DE UNA CARTA RELATANDO UN CASO EN EL BRASIL)

"BSM-11, en combinación con Aldrex-2, es un verdero éxito. Todos los trozos de semilla están germinando, hasta en las zonas más infestadas, donde ya no se podía sembrar más, debido a las hormigas blancas 'ligirius humilis' (Ligyrus sp.), y a la acidez. Ahora, la caña nueva se desarrolla más vigorosamente, y como la copa de las plantas se extiende rápidamente sobre la maleza, no se necesitan más que dos desyerbes, en vez de tres y cuatro anteriormente.

La resiembra resultó ser innecesaria. Nacen tantos tallos, que se puede dejar doble espacio entre los trozos de semilla en el surco. Esto también redunda en economía. En vez de trozos de semilla de tres yemas, probablemente se podrán usar de dos yemas solamente. Debido a esto, el tratamiento no implica costo alguno para el cosechero, por lo que redunda en una importante economía."

Pida más información hoy mismo.

. . . en el ingenio,

USE BUSAN 881

para reducir las pérdidas de sacarosa causadas por

MICROORGANISMOS

durante la elaboración del jugo de caña.

¡BUSAN 881 ayuda a

AUMENTAR LA PRODUCCION DE AZUCAR!

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ESPECIALISTAS EN LA REPRESION INDUSTRIAL DE MICROORGANISMOS

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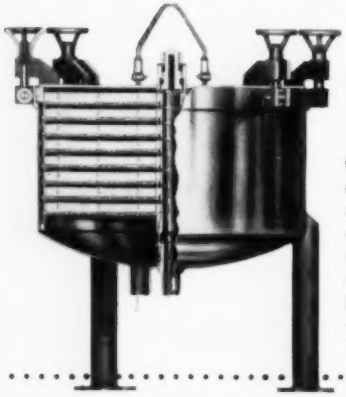

FILTRO NIAGARA DE PLACAS TIPO "BATCH-MISER®" HORIZONTAL

Obtenga 100% de rendimiento de líquido y sólidos con este filtro de flujo rápido, fácil de operar. Es ideal para corridas cortas, filtración intermitente y pasadas finales.

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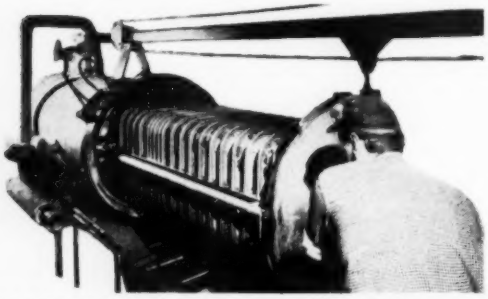

Véase el CHEMICAL ENGINEERING CATALOG para datos sobre los filtros Niagara verticales de hojas a presión, horizontales de hojas a presión, y horizontales de placas.

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ESPECIALISTAS EN LA SEPARACION DE SOLIDOS-LIQUIDOS POR FILTROS de HOJAS a PRESION, de PLACAS y GIRATORIOS al VACIO y por EXTRACCION CENTRIFUGA

Tecnología

Nueva Información Sobre la Solubilidad de Sacarosa

D. F. CHARLES, ante la División de Química de Carbohidratos, American Chemical Society, Abril, 1958.

Debido a la información contradictoria en trabajos escritos, la refinería de la California & Hawaii Sugar Refining Company en Crocket, California, calculó nuevos valores para la solubilidad de sacarosa en agua. Frascos con cristales de sacarosa y soluciones de azúcar fueron alternados en un baño de temperatura constante. A intervalos se extrajeron muestras de licor madre y se analizaron con un refractómetro tipo Bausch & Lomb de precisión. Este instrumento había sido calibrado en términos de los pesos conocidos de la sacarosa y del agua. Los grados de aproximación al equilibrio por encima y por debajo del punto de saturación fueron comparados. La siguiente ecuación expresa la relación entre S, por ciento sacarosa por peso, y t, la temperatura en centigrados:

$$S = 64.392 + 0.07251t + 0.0020569t^2 - 9.035 \times 10^{-6}t^3$$

Esta ecuación se basa en 37 puntos entre los límites de 0° a 85° C. El error de norma de los desvíos residuales de los puntos observados de la curva fue 0.021% de sólidos. Esta ecuación da resultados que son aproximadamente 0.5% de sólidos que la ecuación de Herzfeld a 20° C, y 0.4% de sólidos más alta a 60° C. No obstante, la nueva información está esencialmente de acuerdo con los resultados de otras investigaciones recientes.

■

Relación Entre la Acidez y Decoloración del Azúcar Cuando se Derrite

H. HIRSCHMULLER y H. EICHHORN, *Zeitschrift Zuckerindustrie*, Vol. 8 (83), No. 3, págs. 111-114 (1958).

Cuando el azúcar refino seco que contiene rastros de sales minerales se derrite a alta temperatura, generalmente se torna moreno. La intensidad de esta coloración varía de acuerdo con la naturaleza y cantidad de las impurezas en el azúcar; las sales que tienen la mayor tendencia a producir iones de hidrógeno son las productoras de color más activas.

Con la idea de obtener más información sobre este punto, se llevó a cabo un estudio, durante el cual se redujo a polvo fino azúcar de máxima pureza y se mezcló con las siguientes sales en distintas proporciones, tomadas una por una: NH_4Cl, $(NH_4)Cl$, NH_4NO_3, NaCl, CaCl, Betain-HCl, KCl, Fe_2SO_4, y se calentó a 175° durante 15 minutos; el derretido enfriado se disolvió en agua, y entonces se midieron el color y el pH de la solución. Los resultados acusaron una estrecha correlación entre la intensidad de color y la cantidad de ácido formado; las sales neutrales, como cloruro de sodio y cloruro de potasio, produjeron la menor cantidad de ácido y de color. El color más obscuro y la mayor concentración de iones de hidrógeno (o sea el más bajo pH) fueron producidos por el cloruro de amonio (NH_4Cl). Pero se cree importante observar que aun las sales más neutrales producen cierto grado de acidez y decoloración.

En estos ensayos no fue posible prolongar el calentamiento más de 18 minutos, porque entonces las muestras comenzaron a formar espuma y productos de carbonización que tienden a asentarse. Cuando se calientan con el azúcar, las sales alcalinas producen todavía más decoloración que las sales ácidas; no obstante, cuando la alcalinidad es previamente neutralizada por la adición de SO_2, el color se reduce considerablemente, lo cual demuestra una vez más que la decoloración es una función del pH.

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St. Louis 10, Missouri, E.U.A.

Regulación de Molienda

(Viene de la página 95)

derno de regulación de molienda, en que los datos directos serían el peso de la caña, el peso del jugo mixto y el peso del bagazo. Aunque en este caso y en el Caso I el peso del bagazo se asume ser un dato directo, se entenderá que su cálculo parte del cociente fibra por ciento caña/fibra por ciento bagazo, expresado como un tanto por ciento, de cuyo último se calcula el peso del agua de imbibición por la ecuación fundamental. En este Caso III los cálculos subsiguientes son idénticos a los verificados en el Caso I.

Ahora procederemos con una comparación entre los sistemas antiguo y moderno, tomando los valores obtenidos conforme al Caso I. A fin de demostrar más claramente la discrepancia entre varios de dichos valores, éstos se consignan en la Tabla II al final de este trabajo, la que incluye los nombres y expresiones propias de cada sistema y va encabezada con las denominaciones: Sistema Antiguo—Sistema Moderno.

Los cuatro primeros términos—que son los implicados en la ecuación fundamental—son prácticamente invariables. Existe una pequeña diferencia en las arrobas de jugo diluído y de bagazo calculadas por uno y otro métodos, pero ello se debe al hábito ya establecido de eliminar o incluir la tercera cifra decimal según sea menor o mayor que 5, respectivamente. Esto ocurre al calcular el bagazo en el sistema moderno, cuando el bagazo por ciento caña se determina por la fórmula corriente. Por su insignificancia, esta pequeña diferencia la ignoraremos, y pasaremos a considerar aquellas de mayor importancia sucesivamente en párrafos aparte.

A. La primera diferencia notable que se hace patente en la Tabla II es en el renglón de agua de dilución. En los cálculos por el sistema antiguo se obtuvieron 78,880 arrobas, contra 57,784 arrobas por el sistema moderno. Esta gran diferencia demuestra claramente que el supuesto arbitrario que la dilución por ciento jugo normal es igual a la imbibición por ciento caña (que servía de base para deducir la fórmula para el cálculo de agua de dilución) se aparta mucho de la realidad.

Como secuela de esta marcada diferencia entre las cantidades de agua de dilución calculadas por uno y otro sistemas, ocurrirá otro tanto con todos los demás porcientos donde intervenga el agua de dilución. Esto puede apreciarse fácilmente en la Tabla II, comparando los valores de dilución por ciento jugo normal, dilución por ciento jugo diluído y dilución por ciento caña, calculados por el sistema antiguo, con los correspondientes al sistema moderno.

B. Como consecuencia de la diferencia entre el peso del agua de dilución calculado por uno y otro sistemas también surge una diferencia entre los valores de las extracciones de jugo.

Como anotamos antes, el sistema antiguo da para el agua de dilución un valor muy superior al que se obtiene por el sistema moderno; por tal motivo, cuando se substrae esta agua del jugo diluído para obtener el jugo normal, el resultado es un valor inferior al obtenido por el sistema a base de jugo absoluto. De aquí que la extracción de jugo normal siempre está muy por debajo de la extracción de jugo absoluto, como puede verse en la Tabla II, donde aparece el valor 77.85 contra 81.62.

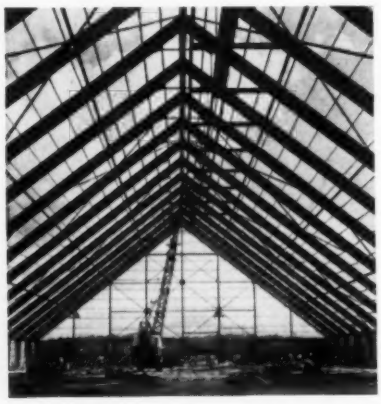
C. En la Table II también figura la diferencia entre los grados Brix y pureza de los jugos normal y absoluto. Por ser, en el sistema antiguo, la cantidad de jugo normal menor que la del jugo absoluto extraído de acuerdo con el nuevo sistema, resulta que el brix de este jugo es más alto (porque las arrobas de sólidos en el jugo diluído tienen que ser divididas entre una cantidad menor), o sean 19.06 contra 18.18 grados Brix.

Por último, sólo nos queda por comparar la pureza del jugo normal y la del jugo absoluto, según se trate de uno u otro sistema. En el sistema antiguo se suponía que la pureza del jugo normal era igual a la del jugo diluído, y partiendo de este supuesto y del valor del brix (previamente determinado), se podía calcular el porciento de sacarosa en dicho jugo.

Pero en el nuevo sistema de regulación de molienda se llega a la conclusión de que tal aserto es falso, y que existe una diferencia entre la pureza del jugo absoluto y la del jugo mixto, siendo *menor* la del segundo porque la pureza del jugo retenido en el bagazo siempre es inferior a la del jugo final. En efecto, esto significa que para que las purezas de ambos jugos coincidiesen, habría que llegar al caso ideal de que el bagazo quedase exento de sólidos solubles, y consecuentemente de sacarosa, o, en otras palabras, libre de jugo, lo que es prácticamente imposible. Si esto llegase a suceder, el contenido de sacarosa en el bagazo sería cero y, por lo tanto, la extracción de sacarosa alcanzaría el valor 100.

Tabla II.

Sistema Antiguo		*Sistema Moderno*	
@ caña molida	560,112	@ caña molida	560,112
@ agua imbibición	101,325	@ agua imbibición	101,325
@ jugo diluído	514,920	@ jugo mixto	514,968
@ bagazo	146,517	@ bagazo	146,469
@ agua dilución	78,880	@ agua dilución	57,784
@ jugo normal	436,040	@ jugo absoluto extraído	457,184
extracción jugo normal	77.85	extracción jugo absoluto	81.62
extracción sacarosa	93.42	extracción pol	93.42
extracción jugo diluído	91.93	extracción jugo mixto	91.94
dilucción por ciento jugo normal	18.09	dilución por ciento j. absol. extr.	12.64
dilución por ciento jugo diluído	15.32	dilución por ciento jugo mixto	11.22
fibra por ciento caña	12.28	fibra por ciento caña	12.28
sacarosa por ciento caña	13.43	pol por ciento caña	13.43
imbibición por ciento caña	18.09	imbibición % caña	18.09
dilución por ciento caña	14.08	dilución por ciento caña	10.32
brix jugo normal	19.06	brix jugo absoluto	18.18
pureza jugo normal	84.57	pureza jugo absoluto	84.24



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Los diseños basados en la experiencia de la U. S. Steel y necesidades del comprador elevan la eficiencia en almacenes de azúcar a granel. La rígida construcción de la armazón (a la izquierda) elimina los soportes interiores y permite utilizar el piso plenamente. El diseño especial de los pares en tres secciones hace que se puedan armar rápidamente y facilitan los embarques por mar; hace que la armazón pueda resistir vientos ciclónicos hasta 150 millas por hora. Además, las estructuras de acero ofrecen las siguientes ventajas: protección contra incendios, mayor duración y menos gastos de conservación. Para datas sobre las economias dables por los almacenes de acero, escriba a: 100 Church Street, Nueva York 8, N. Y., E.U.A.

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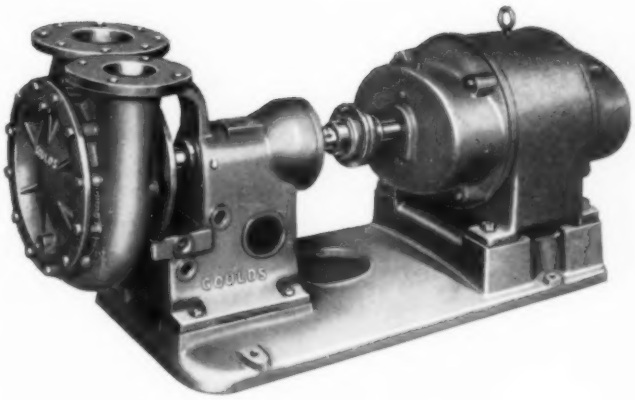
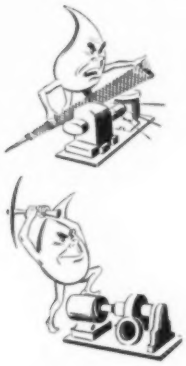


He aquí la bomba para sus liquídos



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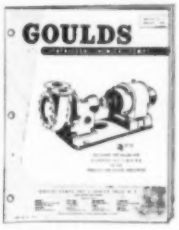

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ADVERTISERS' INDEX
October 1958

Allied Chemical Corporation, Int'l. Div. . . . 92
American Air Compressor Corp. 112
American Express Company 105
Antillian Construction Co., The 98
ASEA 16
Aurora Pump Div.,
The New York Air Brake Co. 90
Bellingham & Stanley Ltd. 56
Bethlehem Steel Export Corp. 85
Borg-Warner International Corp. 104
Brill Equipment Company 60
Broadbent & Sons, Ltd., Thomas 20, 62
Brook Motor Corporation 112
Broussard Machine Company 58
Buckman Laboratories, Inc. 107
Buttner-Werke A. G. 24
Cellulose Development Corp., The 96
Chain Belt Company 79
Combustion Engineering, Inc. 31
Consolidated Packaging Machinery Corp. . . 15
Crane Company 88
Darco Dept.,
Atlas Powder Co. . . . 6, Inside Back Cover
Dicalite Div.,
Great Lakes Carbon Corp. Outside Back Cover
Dorr-Oliver, Inc. 1
Dow Chemical Inter-American Limited . . . 102
Duriron Company, Inc., The 21
Eagle Picher Company, The . . 12-13, 100-101
Equitable Equipment Co., Inc. 61
Escher Wyss Ltd. 11
Evershed & Vignoles Ltd. 32
Ewart Chainbelt Co. Ltd. 15
Falk Corporation, The 17
Farrel-Birmingham Company, The 3
Firestone International Co. 86
Fives-Lille, Compagnie de 28
Fletcher & Company Ltd., George . . . 34, 69
Fly Ash Arrestor Corp., The 77
Fontaine & Co. GMBH 56
Fulton Iron Works Company 109
Gelb & Sons, R. 60
General American Transportation Corp. . . 19
General Electric Company, International . . 91
General Electric Company, Locomotive &
Car Equipment Dept. 87
General Electric Cubana, S.A. 81
Goodyear International Corporation . . . 93
Goulds Pumps, Inc. 114
Gruendler Crusher & Pulverizer Co. . . . 71
Henderson & Co. Ltd., John M. 57
Industrial Filter & Pump Mfg. Co. . . . 27, 75
International Harvester Export Co. 103
J & L Engineering Co., Inc. 18
Johns-Manville Corporation 29, 89
Leffingwell, Roy J. 60
Link-Belt Company 4
Lunkenheimer Company, The . Inside Front Cover
Macfarlane, S.A., Fundicion 76
Manufacturera General Electric, S.A. . . . 84
Masson, E. C. 60
McGraw & Company, F. H. 60
Merrick Scale Manufacturing Co. 72
Minneapolis-Honeywell 23
Mirrlees Watson Co. Ltd., The 82-83
Niagara Filters Div. of
American Machine & Metals, Inc. 108
Norit 26, 78
Ochoa, Guillermo E. 99
Pott Cassels & Williamson Ltd. 57
Productos Morin 58
Reich & Associates, Gustave T. 60
Richardson Scale Company 105
Rose, Inc., E. A. 60
St. Mary Iron Works 111
Sil Flo Corporation 59
Silver Engineering Works, Inc. 25
Smith & Co. Ltd., A. & W. 7
Sparkler Manufacturing Company 55
Squier Corporation, The 97
Stanhope, Inc., R. C. 60
Stein Equipment Company 60
Stork-Hengelo 80
Stork-Werkspoor 30
United States Steel Export Company . . . 110
Watson Laidlaw & Co. Ltd. 22
Wayne & Associates, Truman B. 8
Weaver, Inc., Charles 60
Webster Manufacturing, Inc. 74
Western States Machine Co., The . . . 5, 73
Willys-Overland Export Corp. 14
Wolf, Buckau R. 9
Worthington Corporation 10
Wright Chemical Corporation 53
Wyandotte Chemicals Corporation 33

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